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STATE OF COLORADO  
REPORT  
of the  
Colorado State Board  
*of Health*  
For the Years  
1940-1945



R. L. CLEERE, M.D., M.P.H.  
*Secretary and Executive Director*  
STATE OFFICE BUILDING  
DENVER, COLORADO

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REPORT OF THE  
COLORADO STATE BOARD OF HEALTH  
For the Years 1940-1945

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THE HONORABLE JOHN C. VIVIAN,  
Governor of the State of Colorado,  
Denver, Colorado.

My dear Governor Vivian:

I have the honor to transmit herewith the Report of the  
Colorado State Board of Health for the years 1940-1945.

Respectfully yours,

R. L. CLEERE, M.D., M.P.H.  
Secretary and Executive Director

State Office Building,  
Denver, Colorado,  
October 25, 1946.



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# COLORADO STATE BOARD OF HEALTH

As of December 31, 1945

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Tuberculosis Control.....	ALFRED R. MASTEN, M.D., M.P.H.
Venereal Disease Control.....	WARD L. CHADWICK, M.D.
Vital Statistics.....	FRED W. BEESLEY, D.D.S.

# DIVISION OF ADMINISTRATION

## REPORT OF THE EXECUTIVE DIRECTOR

The period covered by this summary of public health in Colorado extends from the pre-Pearl Harbor year of 1940 through V-J Day and the beginning of the postwar era. The public health army in Colorado suffered some stunning blows during this period through loss of many of its key professional personnel and the inability to recruit new personnel.

The state lost more civilian lives during the past war from preventable and controllable causes than from casualties among citizens of the state serving in the armed forces. We should take pride, nevertheless, in some notable achievements and gains that were made during the war period.

Through collaboration with the State Tuberculosis Association, a mobile X-ray unit was purchased in 1944; and by the close of 1945 thirty-seven counties had received chest X-ray survey service.

In cooperation with the Denver General Hospital, a rapid treatment center for venereal diseases was established in 1943, and a second center was operated for a one-year period in Pueblo. At these centers 3,905 patients received the most modern type of treatment.

The bacteriological and serological laboratory services were expanded, and the first evaluation study of serological tests performed by laboratories was conducted.

Ten cities and two counties adopted the Standard Milk Ordinance recommended by the United States Public Health Service and are operating milk sanitation programs in accordance with its provisions.

Public health nursing services were maintained in more than thirty counties in cooperation with boards of county commissioners and local health councils.

The services rendered to military and industrial establishments cannot be overestimated, particularly in the fields of sanitation, communicable disease control, and industrial hygiene. Personnel assigned by the United States Public Health Service made it possible for the State Division of Public Health to assume, with a marked degree of efficiency, many added responsibilities and duties brought on by the impact of war.

The Emergency Maternity and Infant Care Program, based on the right of the G. I., no doubt contributed greatly to the morale of the armed forces. We owe a debt of gratitude to the State Medical Society, the practicing physicians, and the hospitals of the state for the success of this program.

Through an agreement between the City Council of Trinidad, the Board of County Commissioners, and the State Board of Health, a county health unit was established in Las Animas County in 1944.

Cancer control was forwarded through financial aid and advisory services to the Colorado Division of the American Cancer Society. In the future, the Division of Public Health will supplement this cooperative program with advisory nursing services, statistical research, development of cancer detection centers, and cooperation with the medical profession in cancer control activities.

Research and advisory services were rendered by the various divisions and the Executive Director in relation to proposed health laws and to rules, regulations, and recommendations of the State Board of Health. To foster knowledge of requirements, an issue of the *Laws, Rules and Regulations*, revised 1942, was printed for distribution to interested persons and agencies. Information as to later laws and regulations was disseminated in other ways.

Although there was no organized division for health education, informational services were provided through several media. Through the *Colorado State Board of Health Bulletin*, articles and reports were distributed quarterly to medical and health workers on a mailing list of almost 3,000 names. A small central reference library was maintained and also a lending library of slides, films, and other health education materials. Many of the divisions prepared and distributed educational publications and also provided lecture services.

The most valuable contribution to the public health program was made not by a professional public health worker, but rather by a renowned scientist, Dr. Florence R. Sabin, and by the Subcommittee on Health of the Governor's Postwar Planning Committee, of which she is chairman. As a result of her untiring but not unchallenged efforts during the past two years, the people of Colorado are developing a public health consciousness that cannot help but bring a permanent expansion of preventive medical services and a lowering of death rates from specific preventable and controllable diseases. First, Dr. Sabin was primarily responsible for arranging for a state health study made by Dr. Carl E. Buck, Field Director of the American Public Health Association. Following the study, she spearheaded an educational and informational program for improvement of health conditions that has reached the far corners of the state. Through this program there is a ray of hope for the following accomplishments in the near future:

*Legislative reform of both state and local health laws.*—At present only one-fifth of the total population of Colorado is receiving basic health services through full-time health units.

*Increased state appropriations.*—Colorado appropriates approximately ten cents per capita for state public health programs. This amount is among the lowest expended for such purposes by any state. There is no appropriation for tuberculosis control and only \$6,000 for venereal disease control. The statement of sources of funds and distribution of expenditures in the fiscal year July 1, 1944-June 30, 1945, which is presented in Table I indicates how greatly this state has depended upon federal allotments

for building the foundations of many of its essential public health programs. For adequate future maintenance and development of these programs, increased state appropriations are imperative.

In the past few years, unusually large funds were provided by the Federal Government for public health programs considered wartime essentials. Operation of the rapid treatment centers and other venereal disease control activities, provision of maternity care to wives of servicemen, and maintenance of industrial hygiene activities in Colorado were supported almost entirely by federal funds during the war and early reconversion periods. Now the state and the local areas must assume increased responsibility for health protection.

*Establishment of a real merit system for public health workers, in cooperation with the State Civil Service System.*—The ranks of our public health forces must be replenished. Vacancies exist in many key positions in the Division of Public Health. We cannot compete with other agencies and states without offering professional personnel a career in public health.

*Changes in divisional organization and in policy channels to local action.*—An increasingly well-coordinated and efficient plan of public health administration at the state level is requisite for effective impetus to local action and cooperation in local programs. The new organization plan depicted in Figure 2 has been proposed as a greatly needed improvement over the existing plan shown by Figure 1. A bill to be introduced at the next session of the legislature seeks to establish a Department of Public Health as an independent state agency instead of the present Division of Public Health, which is a division of the Executive Department of the State Government.

It is expected also that there will be increased cooperation between the state public health agency and the home rule cities, such as Denver. Some of these cities, although without organized public health departments, function independently in many health matters. Denver, with about one-third of the population of the state, can contribute greatly to reduction of the mortality rates from preventable deaths in Colorado by progressive improvement of the city health services.

Adequate, unified space for the division offices and laboratories is a need associated with the desired closer integration of programs and expansion of services. At the present time, because of shortage of space in state buildings, it is necessary to rent considerable space in three private office buildings. As of December, 1945, the monthly rental for this space was \$585.00. Increases in the rates charged may be expected in the near future.

With good prospects of definite progress toward the four primary goals stated above, the future of public health in Colorado is bright.

Figure 1. ORGANIZATION CHART, COLORADO STATE DIVISION OF PUBLIC HEALTH  
December 1945

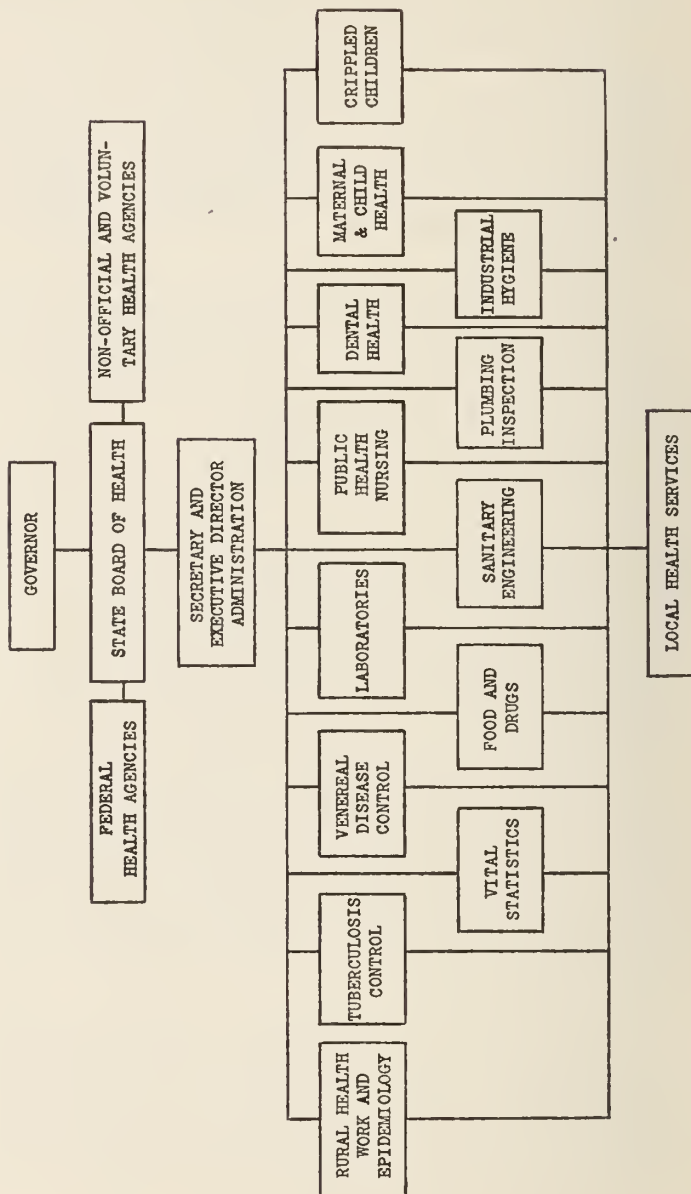
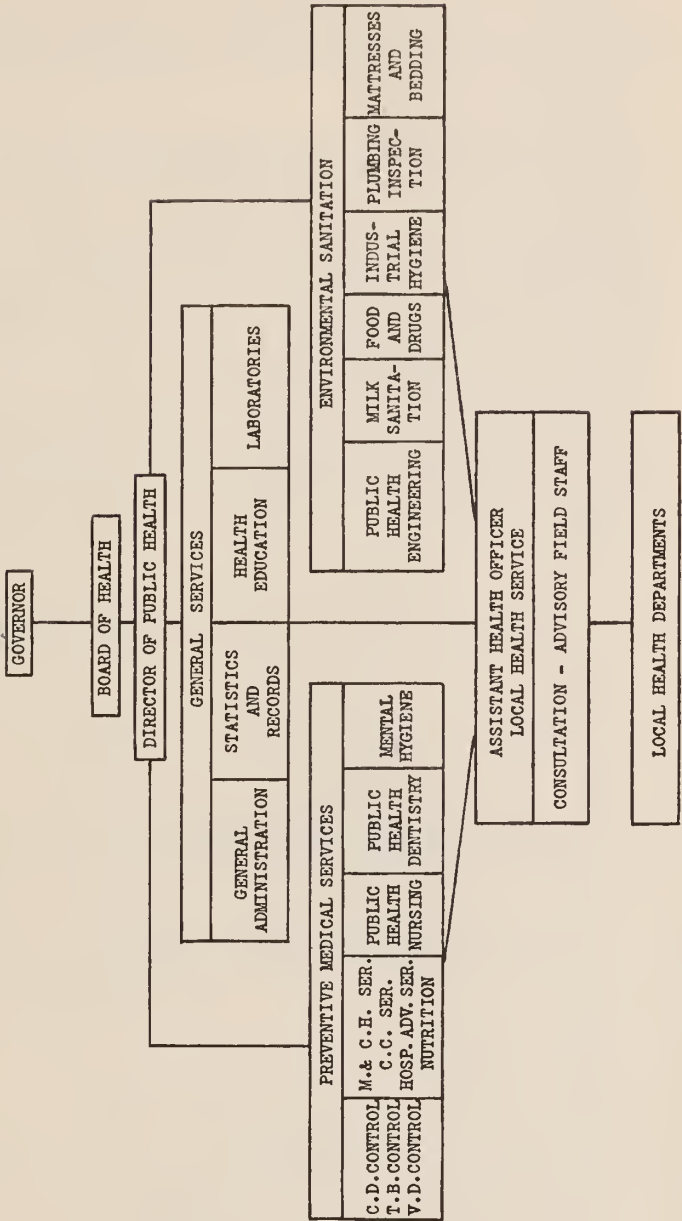


Figure 2. PROPOSED NEW ORGANIZATION PLAN AND POLICY CHANNELS TO LOCAL ACTION  
COLORADO STATE DEPARTMENT OF PUBLIC HEALTH



## REPORT OF THE OFFICE OF BUSINESS MANAGEMENT

The Office of Business Management is responsible for organizing, directing, and coordinating the business activities of the Division of Public Health. This office receives, disburses, and accounts for all monies received by the division and keeps all financial records of the division.

Funds for expenditure are available from the following sources: (1) state legislative appropriations; (2) the United States Public Health Service; (3) the United States Children's Bureau; and (4) private funds such as those of the American Cancer Society, the state or National Tuberculosis Association, the National Foundation for Infantile Paralysis, and the Visiting Nurse Association. Budgets are prepared annually for each project, for the Division of Public Health, the United States Public Health Service, and the United States Children's bureau. Budgets requesting state appropriations are prepared biennially.

Budget records are maintained covering each item in each budget. Postings are done currently by machine. This mechanical operation gives total vouchers paid to date, outstanding encumbrances, and unencumbered and unexpended balances—all by item, by budget.

TABLE I

## STATE DIVISION OF PUBLIC HEALTH, EXPENDITURES FOR STATE AND LOCAL HEALTH PROJECTS, BY TYPE OF PROJECT AND SOURCE OF FUNDS

Fiscal Year July 1, 1944-June 30, 1945

Project Level and Type	Source of Funds									
	Total	State	Local	U. S. Public Health Service			U. S. Children's Bureau			
				General Health Purposes	Veneral Disease Control	Tuberculosis Control	Maternal and Child Health	Emergency Mat. and Infant Care <sup>a</sup>	Crippled Children's Services	Other
GRAND TOTAL	\$1,202,721.84	\$133,384.05	\$149,320.43	\$111,238.75	\$ 91,340.42	\$ 2,790.15	\$ 83,665.83	\$470,556.25	\$ 63,708.83	\$ 96,717.13
Total Local Level Projects <sup>b</sup>	292,554.08	-----	143,955.62	44,260.96	40,294.34	-----	53,543.16	-----	-----	10,500.00 <sup>c</sup>
Total State Level Projects	910,167.76	133,384.05	5,364.81	66,977.79	51,046.08	2,790.15	30,122.67	470,556.25	63,708.83	86,217.13
Administration	36,086.12	11,379.28	-----	17,381.97	864.75	-----	3,381.75	240.46	2,689.92	127.99
Cancer control	17,705.06	-----	-----	3,897.59	-----	-----	-----	-----	-----	-----
Crippled children's services	86,464.17	24,999.59	-----	-----	-----	-----	2,511.23	-----	55,464.58	13,807.47 <sup>d</sup>
Dental health	8,482.45	5,971.22	-----	-----	-----	-----	-----	-----	-----	-----
Epidemiology	5,701.67	887.93	-----	4,813.74	-----	-----	-----	-----	-----	-----
Field orientation and other training	1,499.00	-----	-----	1,149.00	150.00	-----	200.00	-----	-----	-----
Food and drug inspection, etc.	19,094.24	19,094.24	-----	-----	-----	-----	-----	-----	-----	-----
Hospital inspection	2,725.73	2,614.08	-----	111.65	-----	-----	-----	-----	-----	-----
Industrial hygiene	2,424.81	16,186.21	-----	-----	2,424.81	-----	-----	-----	-----	-----
Laboratory services	33,443.76	10,383.35	-----	9,849.55	7,408.00	-----	12,259.89	470,315.79	-----	-----
Maternal and child health	432,959.03	-----	-----	-----	-----	-----	-----	-----	-----	-----
Mattress and bedding inspection	3,282.56	3,282.56	-----	-----	-----	-----	-----	-----	-----	-----
Public health inspection	5,924.63	5,924.63	-----	-----	-----	-----	-----	-----	-----	-----
Public health nursing	19,713.28	955.71	-----	5,356.99	-----	-----	8,390.75	-----	5,009.83	-----
Sanitary engineering	16,178.26	4,413.18	-----	11,765.08	-----	-----	-----	-----	-----	-----
Tuberculosis control	10,905.47	604.73	-----	7,510.59	-----	2,790.15	-----	-----	-----	-----
Veneral disease control, other than rapid treatment centers	28,359.56	5,997.69	-----	1.13	22,360.74	-----	-----	-----	-----	-----
Veneral disease rapid treatment centers	86,869.89	341.21	3,459.13	-----	10,787.88	-----	-----	-----	-----	72,281.67 <sup>f</sup>
Vital statistics and tabulating unit	33,612.57 <sup>g</sup>	20,122.45	-----	3,267.00	6,619.62	-----	3,059.00	-----	544.50	-----
Unpaid obligations	4,755.50	225.99	1,905.68	1,873.50	430.28	-----	320.05	-----	-----	-----

<sup>a</sup> Expenditures for maternity care for wives of servicemen in the four lowest pay ranks and for emergency care for their infants.<sup>b</sup> With minor exceptions, these are health projects of counties funded on a matching basis; that is, 50 per cent from local funds and 50 per cent from federal funds administered through the State Division of Public Health. Under this arrangement, in the fiscal year ended June 30, 1945, 25 counties conducted one or more programs each. Eleven counties had projects under general health funds; 10, under veneral disease funds; and 16, under maternal and child health funds. Of the total expenditures for local projects, about 54 per cent were for programs in the 4 counties with full-time county health units: El Paso, Las Animas, Otero, and Weld Counties.<sup>c</sup> Visiting Nurse Association funds, Denver City and County. <sup>d</sup> Colorado Division, American Cancer Society funds.<sup>e</sup> Concurrently, the Colorado Tuberculosis Association conducted programs closely interrelated with the Mobile X-ray Unit Survey and tuberculosis clinic program of the State Division of Public Health. <sup>f</sup> Federal Works Administration funds.<sup>g</sup> Vital statistics, \$19,285.44—\$17,825.44 from state sources and \$1,456.00 from federal funds for maternal and child health; tabulating unit, including vital statistics tabulations, \$14,327.13—\$2,293.01 from state funds and the rest from federal funds.

## DIVISION OF LABORATORIES

The Division of Laboratories rendered a progressively increasing volume of examination services in the period 1940-1945 through the central laboratory in Denver and three newly established branch laboratories. As need for additional services for the control of communicable diseases became apparent, they were incorporated into the work of the division; and others undoubtedly will be added from time to time. As of December, 1945, the types of examinations performed numbered over thirty.

### ORGANIZATION

To bring the services nearer to doctors who reside at a distance from Denver, a branch laboratory was organized at La Junta in 1939,<sup>1</sup> a second in Greeley in February, 1941,<sup>2</sup> and a third in Trinidad in January, 1945. All of these laboratories are under the general supervision of the Director of Laboratories, who is in direct charge of the central laboratory in Denver. The laboratory services at the Pueblo Rapid Treatment Center for venereal disease, in operation from February, 1944, to March, 1945, also were incorporated into the activities of the division. In the fall of 1944, the Division of Industrial Hygiene was reactivated after temporary cessation of operation, and its laboratory service was reestablished as a part of the Division of Laboratories while a new industrial hygiene laboratory was being equipped. Figure 3 depicts the organization of the Division of Laboratories.

### ROUTINE SERVICES

In order to assist the medical profession in making good use of existing laboratory facilities the division, in the spring of 1944, printed *A Guide to the Collection of Laboratory Specimens and Interpretation of Reports*. The guide listed all of the diseases for which the laboratories of the division performed examinations, made suggestions for the satisfactory collection of specimens, and discussed the nature and interpretation of the reports issued. Copies were distributed to all doctors and nurses in the state. Additional copies are available from all laboratories of the division. The guide has served as a valuable aid to both health workers and practitioners.

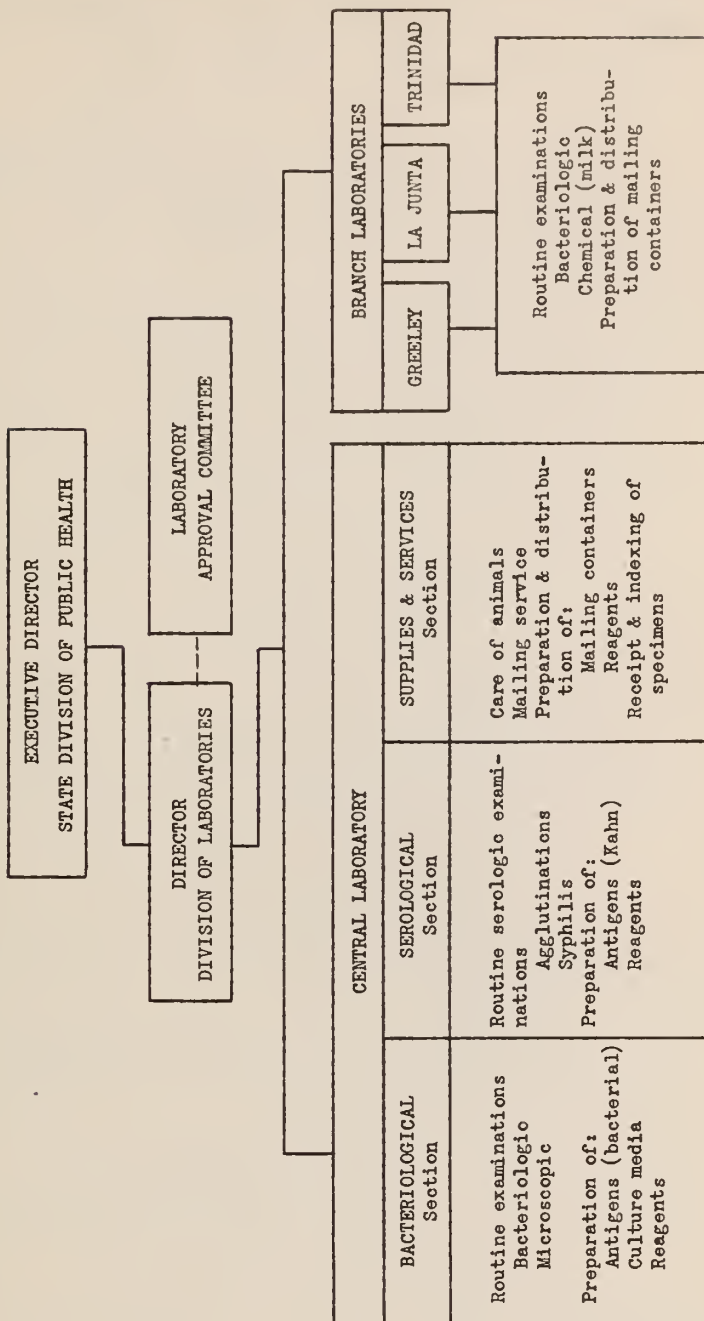
The laboratory services are available, without charge, to physicians, dentists, and public health workers throughout the state. With the exception of water samples, specimens are accepted only from professional workers. Water specimens may be sent directly

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<sup>1</sup>Not in service September through December, 1945, because of the death of the bacteriologist in charge.

<sup>2</sup>Not in service November and December, 1945, because of the resignation of the bacteriologist in charge.

Figure 3. ORGANIZATION CHART - DIVISION OF LABORATORIES  
December 1945



by lay people, provided that they are sent in official containers secured from one of the laboratories and collected according to directions enclosed with the containers.

Among the routine services are the following:

Diphtheria: Nose and throat cultures, including the testing of organisms encountered for virulence when indicated.

Dysentery (Amoebic): Microscopic examinations of stool specimens for the causative organisms.

Dysentery (Bacillary): Stool specimens cultured for the causative organisms.

Gonorrhea: Microscopic examinations of smears and cultures of exudates for the presence of gonococci.

Hemolytic Streptococci: Throat cultures.

Intestinal Parasites: Microscopic examination of stool specimens for suspected parasites and ova.

Malaria and Malaria-like Infections: Microscopic examination of blood smears for the causative organisms.

Meningococcus Meningitis: Culture examinations of blood and spinal fluid for the meningococci; in addition, the typing of the organisms encountered and Colloidal Gold curves with spinal fluid.

Pneumonia: Typing of the pneumococci in sputa.

Rabies: Microscopic examination of animal brains for the Negri bodies.

Rocky Mountain Spotted Fever: Agglutination test with blood serum for the presence of agglutinins for *Proteus* OX<sub>19</sub>.

Syphilis: Darkfield examinations of primary lesion fluid for *Treponema pallida*. Kahn test with blood serum and spinal fluid, including a quantitative evaluation of reagin when indicated. Colloidal Gold curve with spinal fluid.

Tuberculosis: Microscopic and cultural examination of sputa and exudates for *M. tuberculosis*.

Tularemia: Agglutination test with blood serum for indication of infection.

Typhoid and Paratyphoid Fevers: Agglutination test with blood serum for the detection of both O and H agglutinins; blood and stool cultures for causative organisms to detect both cases and carrier state.

Typhus Fever: Agglutination test with blood serum for the presence of agglutinins for *Proteus* OX<sub>19</sub>.

Undulant Fever: Agglutination tests with blood serum for the 3 strains of *Brucellae*. Blood cultures for the presence of the causative organism in open cases and the typing of those organisms encountered.

Vincent's Infection: Microscopic examination of smears from infected areas.

Milk: Standard bacterial counts, butter fat determination, phosphatase test to determine effectiveness of pasteurization and *E. coli* count.

Saliva: Bacterial examination of saliva for presence of lactobacilli.

Water: Standard bacterial analysis of water samples.

In addition, specimens of food substances and other materials suspected of causing disease are examined bacteriologically. Other routine services are the preparation and distribution of diagnostic outfits and of culture media, reagents, and miscellaneous solutions.

To facilitate the use of the various services by doctors throughout the state, the division made available, without cost, containers in which specimens collected at a distance from the laboratory might be sent by mail. The following procedure for procuring the containers was adopted in 1944: (1) In counties *having* a full-time health department, containers may be obtained from the health department; (2) in counties *not having* a full-time health department, containers may be obtained from the nearest branch laboratory or the central laboratory in Denver.

The reporting of laboratory results to doctors in a uniform manner throughout the division was adopted in 1944, as was uniformity in the technique of performing specimen examinations.

In the fall of 1945, a member of the central laboratory staff was assigned to the National Institute of Tropical Diseases, United States Public Health Service, Atlanta, Georgia, for a six-weeks course in the laboratory detection of tropical diseases. Upon her return, this new service was made available from the central laboratory. After personnel of the central laboratory have been trained in these methods, branch laboratory personnel will be trained and the service made divisional.

## VOLUME OF SERVICES

The total number of examinations of all types rose from approximately 24,000 in 1935 to 125,000 in 1940 and reached a maximum of nearly 249,000 in 1944, decreasing to 236,500 in 1945 (Figure 4). The peak year, 1944, included the major period of the temporary operation of the Pueblo Rapid Treatment Center for venereal disease. As may be seen from Table II, however, examinations for venereal disease were not the explanation of the extremely high total for all examinations in that year. The number of venereal disease examinations was lower in 1944 than in 1943 and again decreased in 1945; whereas examinations for other communicable diseases and those related to environmental sanitation increased in both 1944 and 1945. Table III shows the number of examinations performed, by laboratory type and year, 1943-1945.

Among the factors contributing to a high volume of venereal disease examinations in the period 1940-1945 were: (1) blood tests performed in connection with medical examinations of military

Figure 4. TOTAL EXAMINATIONS PERFORMED  
DIVISION OF LABORATORIES  
1935-1945

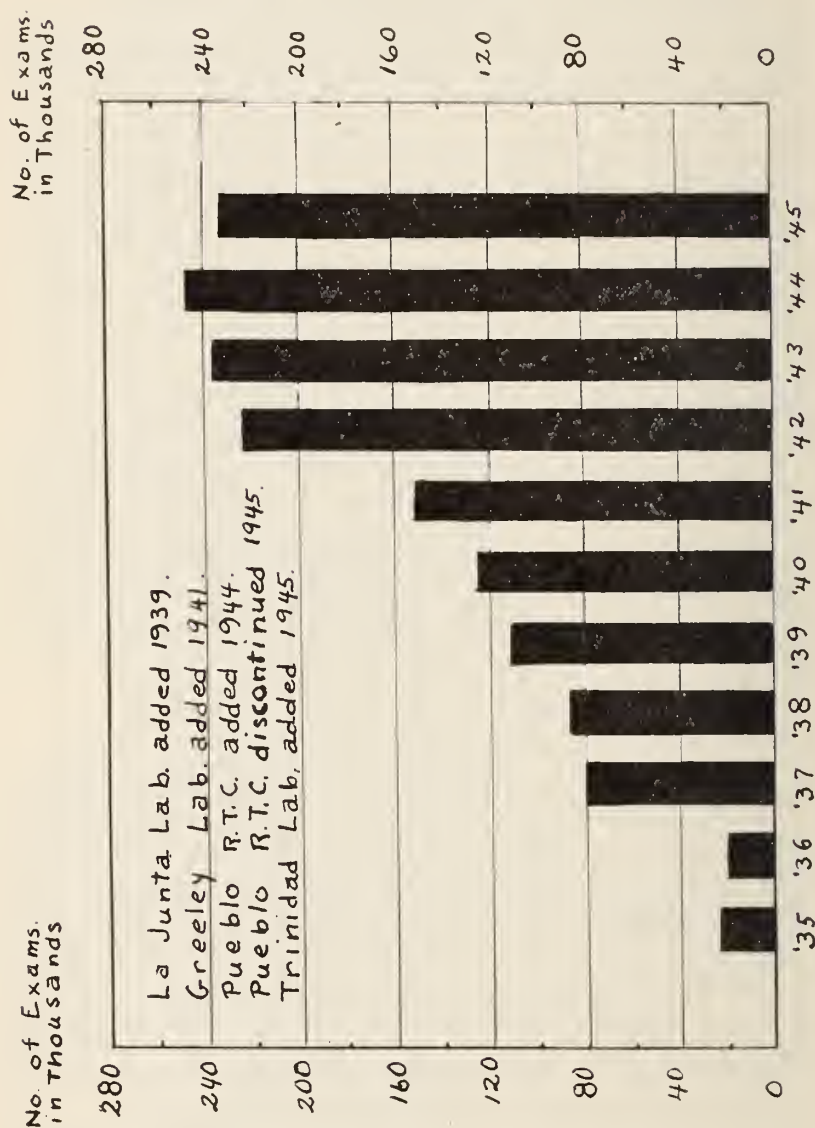


TABLE II  
EXAMINATIONS PERFORMED, BY HEALTH FIELD  
DIVISION OF LABORATORIES, 1943-1945

HEALTH FIELD	1943		1944		1945	
	Number	Per Cent	Number	Per Cent	Number	Per Cent
All examinations .....	239,830	100.0	248,826	100.0	236,552	100.0
Venereal diseases .....	225,875	94.2	219,881	88.4	204,718	86.5
Other communicable diseases .....	10,151	4.2	14,404	5.7	18,364	7.8
Environmental sanitation .....	2,672	1.1	7,464	3.0	10,748	4.5
Other .....	1,132	.5	7,077	2.9	2,722	1.2

TABLE III  
EXAMINATIONS PERFORMED, BY LABORATORY TYPE  
DIVISION OF LABORATORIES, 1943-1945

TYPE	1943		1944		1945	
	Number	Per Cent	Number	Per Cent	Number	Per Cent
All examinations .....	239,830	100.0	248,826	100.0	236,552	100.0
Serology .....	216,569	90.5	203,539	81.1	194,532	82.1
Bacteriology .....	13,176	5.4	22,336	9.8	27,810	12.0
Microscopy .....	8,278	3.4	14,622	5.8	9,793	4.1
Chemistry .....	1,807	.7	8,329	3.3	4,417	1.8

selectees; and (2) the Premarital and Prenatal Laws passed by the General Assembly in 1939 (House Bills 466 and 470), which require blood tests for syphilis of all applicants for marriage licenses and of all pregnant women attended by licensed physicians. The trends in syphilis examinations since 1939 may be studied in more detail from Figure 5. The chart shows the total number of examinations for syphilis, by year, and the serological examinations for that disease, by year and by specific program or group of examinees.

Examinations for gonorrhea increased from approximately 2,800 in 1935 to 6,000 in 1937. Thereafter the number of tests decreased steadily to 3,000 in 1940 and then to a low point of 2,000 in 1942. In the next two years, however, the annual totals increased very greatly, reaching 20,000 in 1944. In 1945 the number of examinations decreased to approximately 14,800. Prior to 1942 only microscopic examinations of smears were performed; in 1942 cultures of exudates were added.

The four charts presented in Figures 6A and 6B show the changing volume of laboratory examinations for tuberculosis, diphtheria, undulant fever (Brucellosis), and the enteric group of diseases in the period 1935-1945. Although the curves differ for the years from 1935 through 1942, all exhibit a steep upward rise from 1942 through 1945.

The number of water sanitation examinations likewise increased very rapidly in recent years. The annual total rose irregularly from approximately 700 in 1936 to 1,850 in 1942, decreased to 1,550 in 1943; and then mounted sharply, reaching 4,650 in 1945.

The number of diagnostic outfits distributed and the quantity of culture media, reagents, and miscellaneous solutions prepared increased as the volume of other laboratory services mounted. In 1945, a total of 199,800 diagnostic outfits were prepared and distributed; and 1,673,205 cubic centimeters of media, reagents, solutions, and the like were prepared.

## LABORATORY APPROVAL PROGRAM

The Premarital and Prenatal Laws enacted by the legislature in 1939 provided that laboratories performing any serological tests for syphilis, as well as the tests performed in accordance with these laws, "shall be approved by the Colorado State Board of Health." In July, 1944, a committee of outstanding professional individuals was appointed by the Secretary and Executive Director of the Board of Health to assist the Director of Laboratories in formulating a program for the approval of laboratories.

The program, approved by the Board of Health in December, 1944, required that the laboratories register with the committee and meet certain standards in order to receive approval. The standards included provisions for minimum personnel qualifications, quarters, equipment, reagents, and maintenance of records; the maintenance of the laboratory service in a professionally ethi-

Figure 5. EXAMINATIONS FOR SYPHILIS  
DIVISION OF LABORATORIES  
1939-1945

No. of Exams.  
in Thousands

No. of Exams  
in Thousands

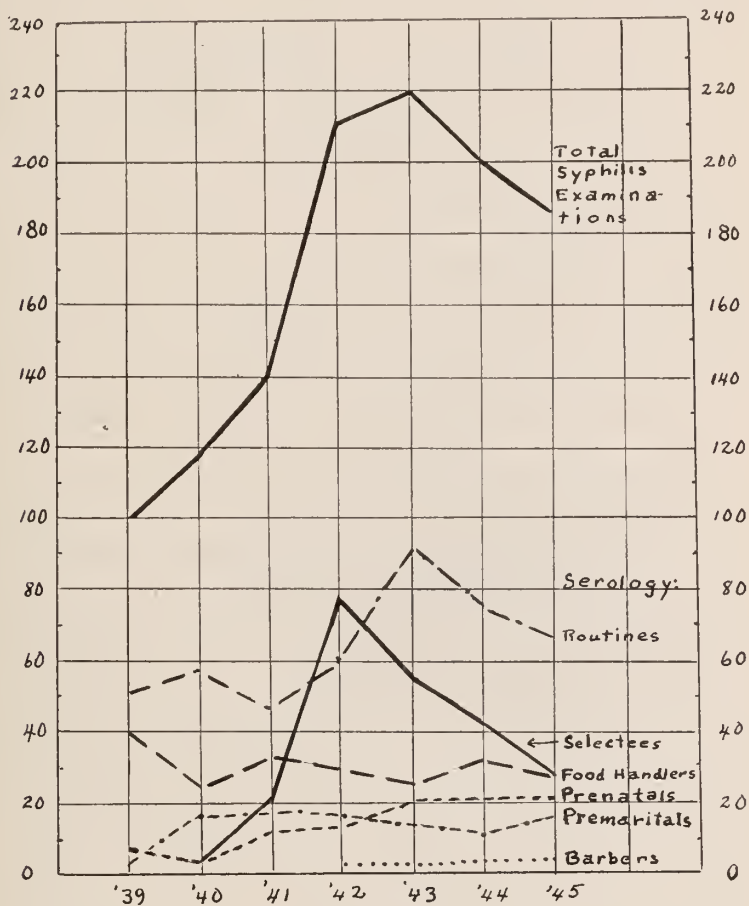


Figure 6A. COMMUNICABLE DISEASE EXAMINATIONS  
DIVISION OF LABORATORIES  
1935-1945

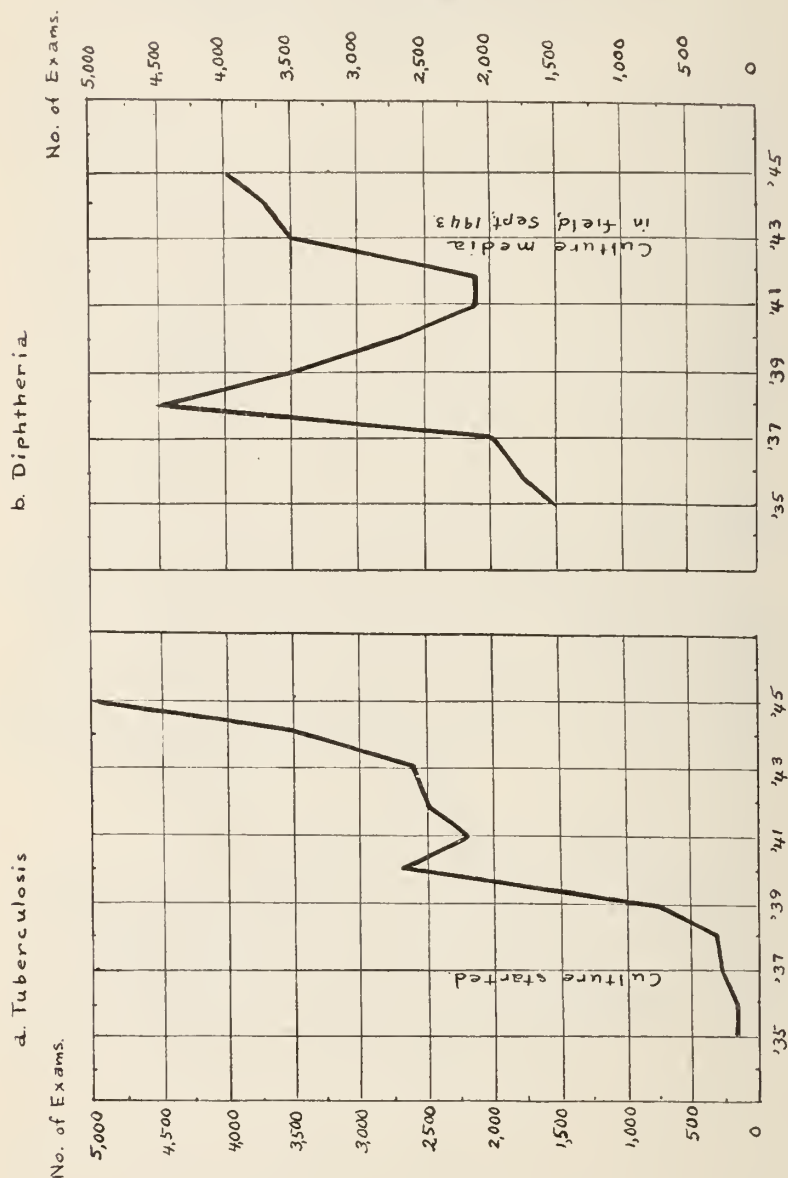
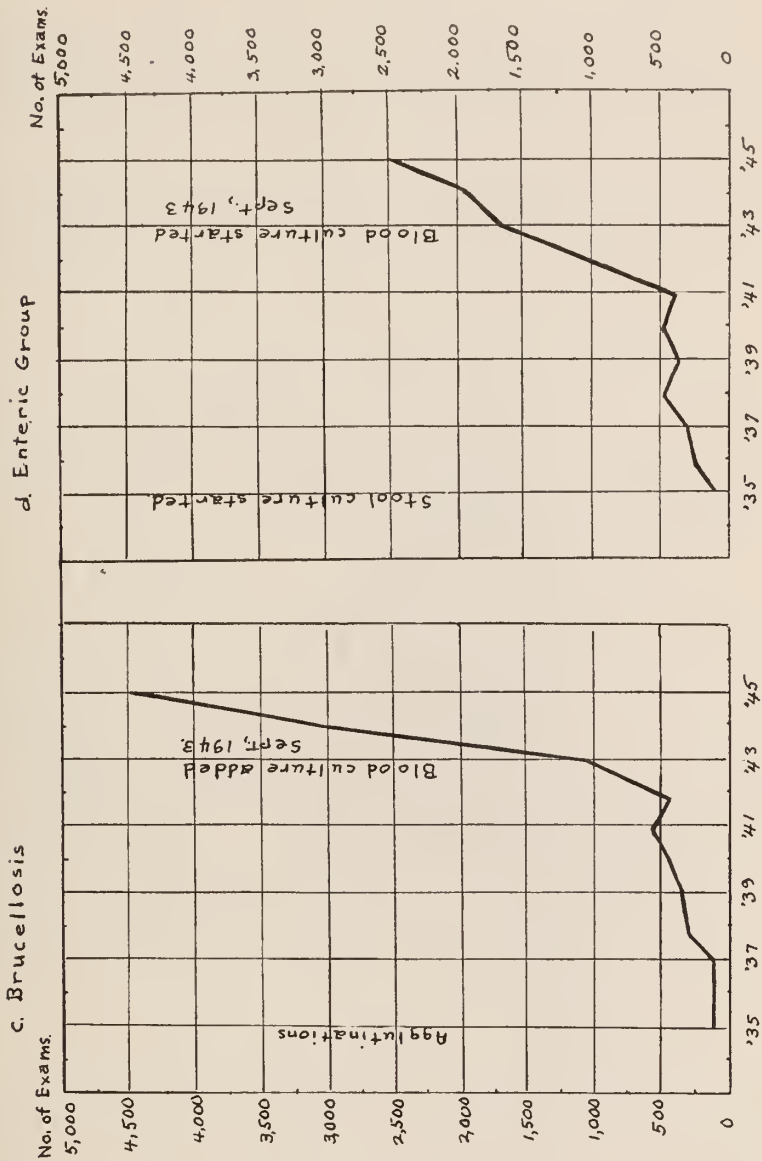


Figure 6B. COMMUNICABLE DISEASE EXAMINATIONS  
DIVISION OF LABORATORIES  
1935-1945



cal manner; and an actual performance test to evaluate "sensitivity" and "specificity" of tests submitted for approval. The committee was authorized by the Board of Health to serve in both an investigative and consultative capacity in putting the program into operation.

The initial inspection of 25 laboratories registered with the committee disclosed that all but 2 satisfied the minimum physical requirements. A second inspection, several months later, showed that 24 of these laboratories satisfied the minimum physical requirements and that one had withdrawn from the program.

The performance test was undertaken in December, 1945. Antigen was provided by the central laboratory of this division for use by the participating laboratories in testing 200 donor specimens each, 100 from infected and 100 from noninfected individuals.

### RESEARCH AND SPECIAL STUDIES

A limited amount of research was conducted by the central laboratory as time and facilities permitted. The nature of the research was of a practical type in that basically it was planned for the improvement of existing services, including the various procedures employed throughout the division. During the period September, 1943–December, 1945, eight methods for the collection of specimens were improved, in addition to a number of other laboratory procedures.

In July, 1943, the central laboratory cooperated with the Denver General Hospital in diagnosing a case of *Coccidioides granuloma*. The patient had been hospitalized for approximately sixty days with an undetermined skin condition. A portion of material aspirated from a skin lesion was examined microscopically and also cultured. Microscopic examination revealed numerous vacuolated spheres with a double contoured capsule closely resembling *Coccidioides immitis*. Cultures upon Sabouraud's Chocolate, and nutrient agars yielded mycelial growth closely resembling the growth produced by *Coccidioides immitis*. A culture forwarded to the National Institute of Health, Bethesda, Maryland, confirmed the identification. So far as could be ascertained, this case was the fifth reported in Colorado since 1928. In that year a case was reported at the Colorado General Hospital, as was also one in 1940. Two cases were reported at the Fitzsimons General Hospital as occurring in 1942 among the armed forces in the Camp Carson area near Colorado Springs.

In the fall of 1943, the state Division of Laboratories cooperated with the United States Food and Drug Administration and the United States Department of Agriculture in an investigation of goat cheese made in Las Animas County. A strain of *Brucella* organisms was isolated from the cheese, and a "clean-up" of the sanitary conditions in its manufacture was instituted. Thereafter, the central laboratory of this division served as a control laboratory for the release of the cheese.

The central laboratory cooperated with Lowry Field officials in an investigation as to the cause of 250 cases of bacillary dysentery among the military personnel in September, 1944. Thirty of the patients were hospitalized because of the severity of the symptoms. Stool cultures from hospitalized patients yielded *Shigella paradysenteriae* (Flexner). The cause of the outbreak was found to be raw cabbage, served as cole slaw, harvested from farms within a radius of 40 miles north of Denver where sewage contaminated water had been used for irrigation. Organisms of both the *Paracolon* and *Shigella* groups of bacteria were isolated in the laboratory examinations.

During the period January–November, 1945, the central laboratory cooperated with the Division of Sanitary Engineering in a stream pollution study of a portion of the South Platte River.

Publications of the Division of Laboratories included, among others, the following:

Gaub, W. H.: "Colorado's Ten Year Record of Intestinal Diseases," *Colorado Municipalities*, Vol. 21, No. 11, November, 1945.

Gaub, W. H.: "Can We Reduce Our Intestinal Diseases?" *Colorado Municipalities*, Vol. 21, No. 12, December, 1945.

Gaub, W. H.: "Environmental Sanitation—A Major Colorado Health Problem," (A review of the problem to be published in the *Rocky Mountain Medical Journal*, February, 1946, issue.)

## DIVISION OF PUBLIC HEALTH NURSING

As new programs are added to attack health problems more adequately, the demands on nursing become greater and greater. Such was the case with this division during the six years covered by this report. The war emergency created the need for new programs and the expansion of old ones in a time of shifting personnel and curtailed travel facilities.

### FUNCTIONS

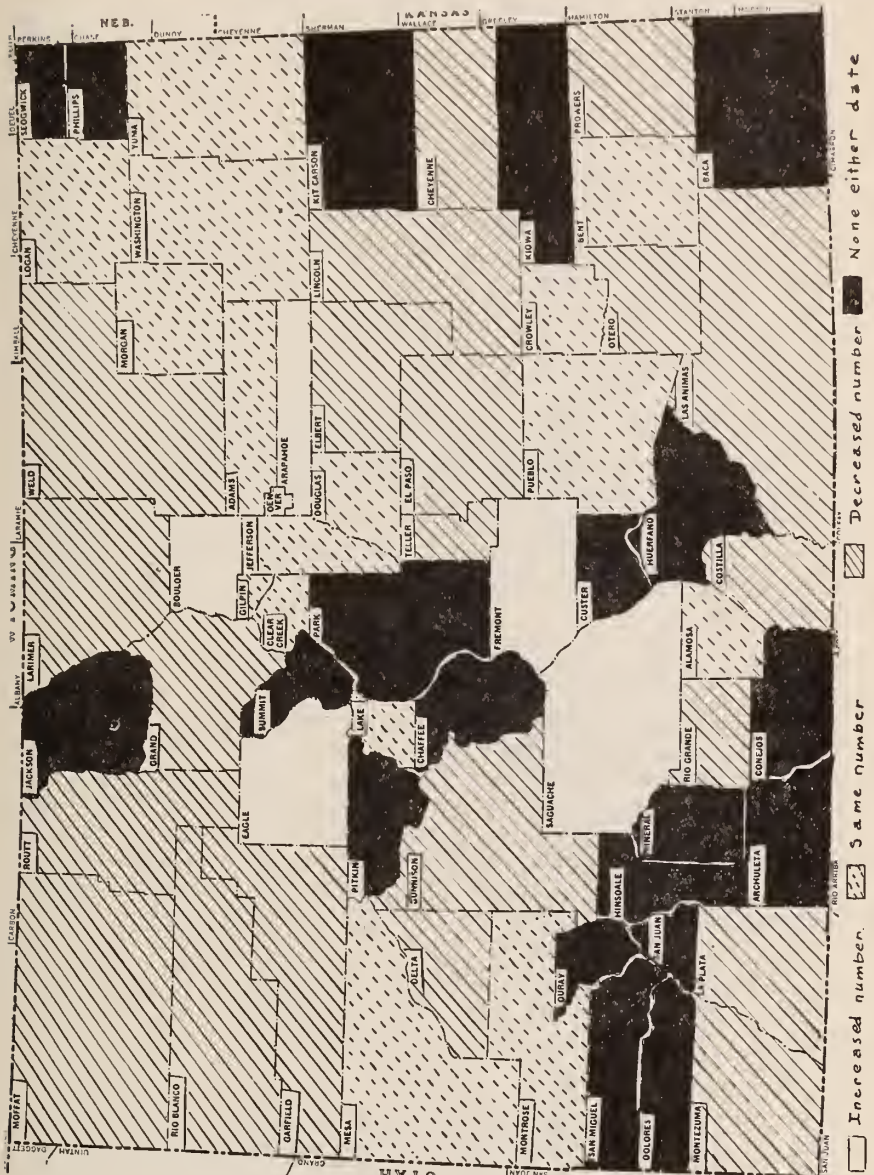
Although the Division of Public Health Nursing is a separate and distinct unit of the State Division of Public Health, it would be difficult to describe it as such. Its activities are dependent upon and completely integrated with the services of the other divisions. The programs in maternity and child health nursing receive direction from the Division of Maternal and Child Health; the program in tuberculosis nursing, from the Division of Tuberculosis Control; and so on with each of the other divisions. Nearly every phase of the specialized programs must be translated into action by the individual and the family if the objectives are to be realized, and the public health nurse is the worker who motivates the individual to take action. In other words, effective public health nursing service attempts to bring together the special activities of a health agency into an integrated, family health service.

This division is primarily concerned with the employment of qualified public health nurses and the maintenance of adequate public health nursing standards in the state. Applicants are referred to health departments, boards of county commissioners, boards of education, and other agencies for employment in local areas. Nurses working in full-time health departments are under the supervision of local advisory nurses. Other public health nurses employed in local nursing programs are given advisory services by consultants from the state office. Advisory service is available also to private agencies employing public health nurses.

### PUBLIC HEALTH NURSES IN COLORADO

The development of defense areas in the state—particularly in the Denver Metropolitan Area and the Pueblo, Colorado Springs, and La Junta areas—necessitated increasing the public health nursing staffs in those places and curtailing service in some others. On January 1, 1940, 38 counties had one or more full-time public health nurses and 2 additional counties were served jointly by one nurse; whereas at the close of 1945 only 32 counties were served by full-time nurses. There was, however, no appreciable decrease in the number of such nurses employed in the state as a whole. On January 1, 1940, there were 177 full-time public health nurses and 12 industrial nurses, in comparison with 172 public health nurses and 46 industrial nurses on December 31, 1945. Increase or decrease in the total number of public health nurses in each county is shown by the shaded map (Figure 7). The tabula-

AND DECEMBER 31, 1945



DETAILED KEY FOR FIGURE 7  
NUMBER OF FULL-TIME PUBLIC HEALTH NURSES, BY COUNTY AND NURSING CLASSIFICATION  
January 1, 1940 and December 31, 1945

COMPARATIVE STATUS AND COUNTY				January 1, 1940			December 31, 1945			COMPARATIVE STATUS AND COUNTY				January 1, 1940			December 31, 1945		
	Total	Gen- eral- ized	Spe- cial- ized	Total	Gen- eral- ized	Spe- cial- ized	Total	Gen- eral- ized	Spe- cial- ized	Total	Gen- eral- ized	Spe- cial- ized	Total	Gen- eral- ized	Spe- cial- ized	Total	Gen- eral- ized	Spe- cial- ized	
Increased number																			
of nurses:																			
Arapahoe	2			5	5	-								1	1				
Boulder	5			6	3	3								1	1				
Denver	68	*		83	*	*								1	1				
Eagle	-	-		1	1	-								1	1				
Fremont	-	-		1	1	-								12	11	1		1	
Saguache	-	-		1	-	1								2	1	1		1	
Decreased number																			
of nurses:																			
														1	1				
														2	1	1		1	
														2	1	1		1	
														7	3	4		3	
														6	6	-		4	
														1	1			1	
														1	-	1		-	
														1	1			-	
														8	6	2		2	
														2	2			-	
														1	1			-	
														2	-	2		1	
														2	2			1	
														1	1			-	
														2	2			-	
														1	1			-	
														13	9	4		8	
																		1	
Same number of																			
nurses:																			
Adams	2			2	2									2	1				
Alamosa	2			2	1	1								7	3	4		3	
Bent	1			1	1									6	6	-		1	
Clear Creek and														1	1			-	
Gilpin	1			1	1									1	-	1		-	
Crowley	1			1	1									1	1			-	
Douglas	1			1	1									2	6	2		2	
Jefferson	4			4	2	2								2	2			-	
Lake	1			1	1									2	-	2		1	
Logan	2			2	1	1								2	2			1	
Mesa	3			3	1	2								1	1			-	
Montrose	1			1	1									1	1			-	
Morgan	2			2	1									9	9			8	
Pueblo	11			11	4	7								13	7			1	
Washington	1			1	1									1	1			-	
Yuma	1			1	1									1	1			-	
No nurses either																			
date:																			
20 counties (See map, Figure 7.)																			

\* Data on nursing classification not available.

tion in the detailed key for the map shows the number of public health nurses, by generalized or specialized service, on each of the two dates, by county.

From 1940 to 1945, the number of agencies employing public health nurses declined from 65 to 39 in rural areas (the open country and places of less than 10,000 population) but increased from 14 to 15 agencies in urban areas. Fifty-four per cent of the nurses were employed in rural areas in 1940, in contrast to only 41 per cent in 1945.

Eight public health nurses from official health agencies in Colorado served with the armed forces during the war. Others left the state because of higher salaries elsewhere. In 1940 more than one-half of the public health nurses outside of Denver received their salaries from federal funds allocated through the State Division of Public Health. Repeated attempts to establish an acceptable state-wide merit system and compensation plan failed, and there was little promise of security in a nursing position or of an increase in salary. However, through considerable effort on the part of the nursing division and the fiscal officer of the State Division of Public Health, arrangements were made to pay nurses from local pay rolls. More and more financial responsibility was assumed by boards of county commissioners, and increases in salary and in travel allowances were made in most areas. During 1945, all but three of the counties with public health nurses were paying them locally. These counties received approximately one-half of the expense of the nursing service by reimbursement from federal funds through this division.

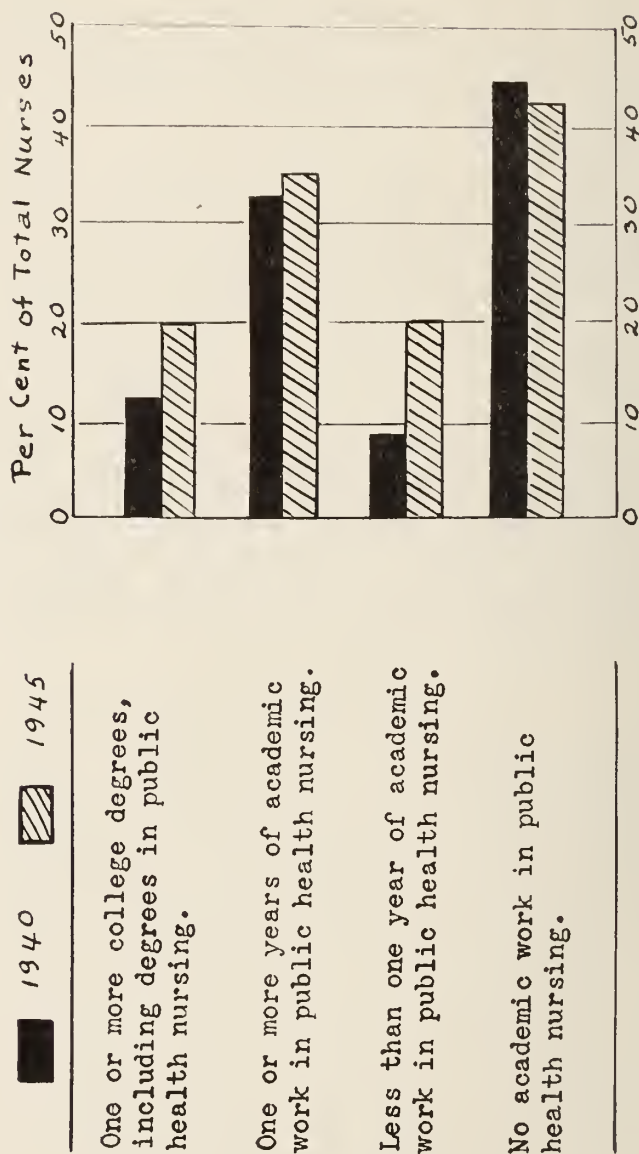
## QUALIFICATIONS AND TRAINING

The qualifications of nurses employed in full-time public health nursing positions in the state improved slightly during the six-year period covered by this report. On January 1, 1940, 53 per cent of the nurses had received some formal training in public health nursing in accredited schools; and by December 31, 1945, the proportion had increased to 57 per cent. In both years, 61 of the nurses held certificates in public health nursing. Additional comparisons as to the amount of training are shown by Figure 8.

During 1940, 1941, and 1942, 12 nurses received assistance from Social Security funds, through the state, for education in public health nursing; but early in 1943 the State Government discontinued use of federal funds for training purposes. After that time, Colorado lost nurses to other states which offered training funds on the condition that the nurses remain for at least two years of employment in the state granting the training.

A classification of nurses designated as "war emergency nurses" was set up to meet the need for workers in the field during the war. These were graduate, registered nurses but were without training or experience in public health nursing. They were assigned

Figure 8. QUALIFICATIONS OF FULL-TIME PUBLIC HEALTH NURSES EMPLOYED IN COLORADO  
1940 and 1945



to areas where there was full-time supervision, to be replaced by fully qualified public health nurses when the latter became available. Several of the "emergency" nurses planned to enter courses in public health nursing.

Many nurses who have returned from military service are studying under the G. I. Bill of Rights in schools of public health nursing. It is hoped that some of these will seek employment in Colorado.

The course for public health nurses inaugurated by the University of Colorado in 1942 proved of great value to the state. At the close of 1945, there were 14 nurses employed in public health nursing in Colorado who had received their certificates in public health nursing from that institution. Many of these nurses were assisted in obtaining their specialized education through federal funds made available directly to the University during the war by the Bolton Act.

When the course in public health nursing was started at the University, the development of additional practice fields for students became a necessity. Previous to that time, the Denver Visiting Nurse Association was the only agency in the state sufficiently developed to be used for field experience. That agency had been giving affiliation in public health nursing to undergraduate students for several years and, at times, to graduate students from other states.

The first graduate students to be given rural experience in Colorado were sent to the Otero County Health Department in 1943. Later the Weld County Health Department was used, because of depleted staff in Otero County. The City-County Health Unit of El Paso County took undergraduate students from time to time; but, because of changes in personnel there, student affiliation was discontinued in 1945. The Arapahoe County nursing service has been used occasionally to help meet the need for undergraduate field experience. None of these fields are ideal as to organization, stability of program, or qualifications of personnel. However, a joint committee, including representatives from the Weld County Health Department, the city of Greeley, and the State Division of Public Health has been working to develop a good teaching center in Weld County. The Kellogg Foundation has been approached for a grant to complement the county and city budgets so that the program may be stabilized and excellently prepared personnel may be attracted to the area.

In-service education programs were conducted in several areas of the state during the six years 1940-1945. The subjects included venereal diseases, orthopedics, morbidity nursing (general sickness nursing), the care of the premature infant, rheumatic fever, school health, and social hygiene for adolescents. An intensive program of study on tuberculosis is being planned for 1946.

During 1943 and 1944 nurses were brought to the Children's Hospital in Denver for several days of intensive work in the Kenny

method of treatment for poliomyelitis. The venereal disease clinics in Trinidad, Pueblo, and Denver were used for special training of nurses who were planning this type of clinics for other areas.

In 1944, the advisory nurse in maternal and child health of the State Division of Public Health went to Michael Reese Hospital in Chicago for three weeks of training in the care of the premature infant, and in 1945 she spent three weeks in Cleveland studying visual aids in education. The senior advisory nurse in orthopedics will complete a year of training in physiotherapy early in 1946.

### ADVISORY SERVICES

The State Division of Public Health Nursing employed six and sometimes seven nurses in advisory positions during the period 1940-1945, although at times vacancies existed in several of the positions. These nurses gave advisory service in the fields of their specialties and also in generalized nursing activities. In addition, the functions of public health nurses were interpreted locally in efforts to secure recognition of the value of their work and to obtain, through local officials, adequate financial provision for sufficient nurses and effective work.

The cities of Denver and Pueblo and the four counties with full-time county health services (El Paso, Las Animas, Otero, and Weld) had their own supervising nurses. In those areas, therefore, the advisory services by this division were confined to assisting the local supervisors in the specialized fields of nursing and to implementing the work of the health officers.

To provide the unorganized areas with advisory services in generalized as well as in specialized nursing in the most economical way, the state was divided into six districts early in 1941. An advisory nurse—with one specialty or another—was assigned to each district, and shifts in personnel and district lines were made as need arose. Under this plan, which was in operation throughout the period of this report, each advisory nurse gave supervisory help to the nurses in her district, as needed, and also direct service to selected orthopedic and venereal disease cases in counties not covered by local nursing service. Furthermore, each advisory nurse cooperated with the directors of the various programs of the State Division of Public Health in developing plans for special clinics, educational programs, and other activities in counties in her district.

The advisory nurse responsible for school health service assumed leadership during 1941 in organizing a Joint Committee on School Health. This committee, cooperating with the State Department of Education, developed school health policies for adoption throughout the state. As an outgrowth of this work, a subcommittee under the chairmanship of the advisory nurse prepared a health handbook for teachers, *Conserving the Health of Colorado's Children*, published in 1944. The handbook has received

favorable comment from many sections of the United States and has been a great help to public health nurses in this state in their work with teachers.

A special activity of the advisory nurse in maternal and child health was the chairmanship of a committee of the Colorado League of Nursing Education, which was organized in 1944 to study standards of care in nurseries for the newborn and to make recommendations for safe care.

In 1944 a vacancy occurred in the position of venereal disease advisory nurse which was not filled for a number of months. When a new nurse was employed late in 1945 she was allowed to spend all of her time in venereal disease work, and she will not be given a district for general supervision until nursing in venereal disease control is brought up to standard.

In 1945, an advisory nurse was assigned to the Division of Industrial Hygiene to give special assistance to nurses in industry.

### CHANGES IN EMPHASIS

This division spent considerable time in the early war years in helping nurses in the field meet new needs as they arose. For example, many areas with increasing populations had to plan additional immunization programs and to expand facilities for venereal disease treatment. Frequently the major part of the planning fell on the nurses.

As administered in Colorado, the national Emergency Maternity and Infant Care Program for the wives and infants of servicemen in the four lowest pay ranks provided for medical, hospital, dental, and public health nursing services for maternity cases; medical services for the infants in the event of illness or special need; and public health nursing services for the infants. Paid medical services under federal funds were authorized through the Division of Maternal and Child Health or, in some instances, through the local public health agency. The patients were referred to the physicians, hospitals, and dentists of their choice and also to the public health nurses. Nursing services for other mothers and infants also were maintained as fully as possible with the available public health nursing staffs. In some areas, classes were organized for the expectant mothers by the Red Cross, with the local health department nurses as teachers.

As a result of defense preparations early in 1941, the public health nurses were called upon to teach an increasing number of adult Red Cross classes in home nursing and first aid. They did this willingly, often after working hours, until other nurses and laymen could be prepared to assume responsibility.

Special attention was given to nutrition in all public health nurses' activities during the years 1940-1945. School lunches were emphasized in cooperation with the War Food Administration

and other interested agencies. Alert nurses found it necessary and challenging to assist harassed mothers in making food dollars and ration points provide the maximum of protective foods. This division—assisted by the State Nutrition Council, the Extension Service of the United States Department of Agriculture, and other agencies—compiled educational materials and simple devices to be used by nurses in teaching nutrition.

Social hygiene problems of boys and girls were brought to the nurses by teachers in numerous areas, particularly in those where many of the parents were away from home because of employment in war industries. In 1943, to help meet these needs, a special committee representing the Denver Public Schools, the State Board for Vocational Education, and this division compiled material for a bulletin entitled *Outline for Giving Social Guidance in the Teen Age*. The bulletin was widely distributed for use by teachers, nurses, social workers, and other group workers.

Nursing follow-up on tuberculosis was emphasized during the war years. Beginning in 1944, this division employed two nurses to organize areas for the Mobile X-ray Unit Survey of the Division of Tuberculosis Control and to do follow-up work on cases found in areas not covered by local nursing service.

When rapid treatment centers for venereal disease were opened in Denver and Pueblo in 1943 and 1944, it was necessary to recruit and train nurses for this work.

School services given by generalized nurses decreased during the six-year period because of pressure of other work.

Unusually great prevalence of poliomyelitis in 1943 and again in 1945 occasioned a high number of nursing visits in that connection.

## RECORDS AND VOLUME OF SERVICES

In 1941 the nursing division assumed responsibility for revision of the records and reports used in field service and for reorganization of the entire reporting system, as recommended by the Joint Records Committee of the United States Public Health Service and the United States Children's Bureau. The change meant simplification of records and resulted in considerable saving of nurse-time.

With one or two exceptions, all full-time public health nurses employed under official funds, outside of the cities of Denver and Pueblo, report their activities to the state Division of Public Health Nursing on forms recommended in 1941. These forms, together with family service records and other records, are furnished to reporting agencies by this division. The admissions to nursing service and the number of nursing visits, as reported for 1945, are shown in Table IV, by health field. In many of the specialized categories, the annual number of patients increased during the war years. In most of the services, however, the visits per patient decreased because of the heavy case-loads carried by the available public health nurses.

TABLE IV  
HOME AND OFFICE PUBLIC HEALTH NURSING VISITS<sup>a</sup>  
BY HEALTH FIELD, COLORADO, 1945

HEALTH FIELD	Admissions to Nursing Service	Visits <sup>b</sup>		
		Total	Home	Office
Total .....	29,779	74,904	60,087	14,817
Preschool and infant hygiene .....	8,051	16,431	14,551	1,880
Preschool .....	4,333	7,849	6,810	1,039
Infant .....	3,718	8,582	7,741	841
School hygiene .....	5,529	9,441	6,947	2,494
Maternity .....	3,889	7,358	6,994	364
Prenatal .....	2,128	3,706 <sup>c</sup>	3,454 <sup>c</sup>	252
Postnatal .....	1,761	3,652	3,540	112
Morbidity				
(general sickness nursing) .....	3,543	12,185	10,468	1,717
Tuberculosis .....	3,097	6,901	6,182	719
Communicable disease .....	2,765	7,328	6,792	536
Venereal disease .....	1,532	11,089	4,460	6,629
Crippled children .....	1,373	4,171	3,693	478

<sup>a</sup> With a few exceptions, visits by full-time public health nurses employed under official funds, exclusive of the cities of Denver and Pueblo.

<sup>b</sup> Exclusive of "first" or "admission" visits.

<sup>c</sup> Includes 47 instances of home delivery nursing service.

## ADVISORY COMMITTEES

Strong citizens' nursing advisory committees in the local communities are of great importance in obtaining support and assistance for the public health nursing program. In some places these committees were more or less inactive during the war, because practically every community had its own Defense Council with a health committee and also because the Red Cross and other organizations were sponsoring nursing activities for a time. For similar reasons, the Auxiliary to the Public Health Section of the Colorado State Nursing Association was dissolved in 1943. The Board of Directors of the Auxiliary had acted as the advisory committee of the state Division of Public Health Nursing. Plans are being made to organize a new advisory committee in 1946.

## RECOMMENDATIONS

In view of needs strikingly manifest during the six years covered by this report, the following recommendations are made:

That the full range of health department services be established in the local areas as soon as possible because too many areas are relying on public health nursing alone to meet their

health needs; whereas nursing is only a part, although a very important part, of an adequate health program.

That satisfactory personnel policies and a plan of adequate compensation be established under a state-wide merit system in order that more, qualified nurses not only may be employed but also retained.

That attempts be made to interest service clubs, professional organizations, and other groups in establishing loan funds or scholarships to assist nurses in preparing for careers in public health.

That the state policy of not using federal funds for training be changed.

That every effort be made to develop fully an outstanding field-training center in Weld County, not only for nurses but for other public health personnel as well.

That employing agencies throughout the state make plans for purchasing and maintaining at least one or two cars which can be used by nurses who wish to do public health work but are financially unable to own cars; or, if the employing agency cannot finance the purchase of a car, that a service club or some other group interested in health work do so.

That all agencies make provision for at least part-time clerical help for the nurse or nurses in the area in order to prevent loss of nurse-time in routine office and clerical work.

That an attempt be made to organize and reactivate citizens' nursing advisory committees into fully functioning bodies in all areas of the state.

## DIVISION OF VITAL STATISTICS

The volume of work done and the number of persons employed in the Division of Vital Statistics increased during the six-year period 1940-1945. Among the circumstances contributing to the augmented work of the division were wartime demands for copies of birth records, new legislation pertaining to vital statistics, and special tabulation services for other divisions.

### BIRTH AND DEATH REGISTRATION AND TABULATION

In round numbers, 137,400 births and 72,000 deaths among Colorado residents were recorded by the division for the six years 1940-1945.<sup>1</sup> The performance of this basic vital statistics function required a detailed, continuous office procedure on a rigid time-schedule related to:

Receiving original birth and death certificates from local registrars, who retain copies in their files.

Preparing transcripts of all original certificates for transmittal to the United States Division of Vital Statistics.<sup>2</sup>

Preparing special transcripts of a monthly ten-per-cent sample of death certificates to be transmitted to the United States Division of Vital Statistics in order to permit release of provisional statistics on a current basis.

Making special transcripts of certificates of deaths from motor vehicle accidents for referral to the Motor Vehicle Accident Bureau of the State Division of Highways and entry of additional facts concerning the accidents before transmittal to the United States Division of Vital Statistics.

Exchange of information on births and deaths, in this state, of nonresidents of Colorado; and on births and deaths among Coloradans away from the state.

Coding, key punching, and machine tabulating detailed natality and mortality information from the birth and death certificates.

Preparing annual statistical reports containing tables on births and deaths by classifications such as sex, color, and type of medical attendance for natality statistics; and by age, sex, other personal details, and cause of death for mortality statistics.

The transcripts sent to the United States Division of Vital Statistics were coded and tabulated in Washington according to rules of that agency for publication of statistics for the United

<sup>1</sup>Annual figures as published by this division differ somewhat from those published by the Federal Government because of difference in residence allocation, final corrections for queried certificates, and certain other final revisions.

<sup>2</sup>Under the Bureau of the Census, United States Department of Commerce; changed to the National Office of Vital Statistics, United States Public Health Service, Federal Security Agency, after July, 1946.

States as a whole and for each state. For purposes of state by state comparisons and state to nation comparisons, the final figures published by the federal agency often are preferred. In the meantime, the more currently tabulated reports prepared by the state Division of Vital Statistics are available for prompt release of information on request. They are valuable sources of state and county statistics required for up-to-date analysis of specific natality and mortality subjects, and include certain data not published by the national vital statistics office. Plans are being made to publish, in separate supplements, the annual reports of the state Division of Vital Statistics for each of the five years 1941 through 1945.

### NOTIFICATION OF BIRTH REGISTRATION

Issuance of Notifications of Birth Registration accompanied the recording of births throughout the period of this report. The principal items of information shown on the original certificates were printed on special forms on the mechanical punch-card tabulator. These forms then were mailed in franked envelopes to the parents of all infants for whom certificates of birth were received by this division. The notifications served not only as verifications of the fact of birth registration but also helped to stimulate interest in prompt reporting of births and in correction of any inaccuracies in the main items of information, as shown by the notification forms. In addition, the forms are useful to the individuals as sufficient proof of the major facts of birth for many purposes for which certified copies are not a legal requirement.

In compliance with revised procedures of the national vital statistics office, the notification forms will be replaced in 1946 by photostatic copies of the original birth certificates. The copies will be sent by the state vital statistics office to the parents of the infants for retention, and will be accompanied by query forms concerning the accuracy and completeness of the entries on the certificates.

### CERTIFIED COPIES AND DELAYED AND AMENDED CERTIFICATES

During the war the division was deluged with requests for certified copies of birth certificates to be used as proof of age and citizenship by persons entering military service or seeking employment in war industries. This need was met by use of photostatic equipment installed in 1940. Approximately 112,000 certified copies were issued on a fee basis in the period 1940-1945, the heaviest demand occurring in 1942. In addition, an increasing number of copies were issued free to veterans in the latter part of the period. The free copies issued in the year 1945 totaled 2,113.

An act passed by the General Assembly in 1941 and amended in 1943 permitted (1) the recording of any birth or death not

previously recorded, and (2) the filing of a correction certificate on any inaccurate record previously filed. By the close of 1945, more than 116,000 of these delayed or amended certificates had been recorded.

In 1943 an amendment to the Vital Statistics Law authorized the filing of a new birth certificate, in the case of adoption, to show the foster parents as the actual parents. The amendment also provided for the issuance of a new certificate showing legitimate birth for a child born out of wedlock but subsequently made legitimate by the intermarriage of the parents and the formal acknowledgment of paternity by the father. Some 3,300 certificates had been issued under the provisions of the amendment by December 31, 1945. This service greatly increased the work of the division without increasing the revenue, as no provision was made for the collection of fees for the new certificates.

### IMPROVEMENT OF REGISTRATION

The registration of births, deaths, and stillbirths is being studied with a view to improving the promptness and completeness of the reporting. The director of this division has inaugurated a series of field trips which will be continued into 1946. Local registrars are visited and instructed as to the conduct of their offices. Physicians and morticians also are interviewed in order to emphasize the importance not only of filing certificates but also of having them correct and complete. The field service is so scheduled that guidance is being given first to the areas for which registration has been least satisfactory.

The shaded map of Colorado (Figure 9) indicates, by county, the results of a test of the completeness of birth registration made in connection with the 1940 population census. A special report was made on each birth occurring between December 1, 1939, and April 1, 1940. One year later these reports were matched with birth certificates which had been filed with the state Division of Vital Statistics. The percentage given for each county indicates the completeness of registration as indicated by this test. For example: There were 1,998 births in Denver during the 4 months stated above. Certificates were filed on 1,932 of these births. Therefore, the reporting in Denver was 96.7 per cent complete. For the state as a whole, 89.8 per cent of the births were reported. The completeness of registration ranged from 32.9 per cent in the lowest county to 100 per cent in 12 counties. As 90.0 per cent is considered the *minimum* satisfactory level, the registration in numerous counties needed to be improved considerably. For the United States as a whole, the completeness of registration was 92.5 per cent.<sup>3</sup>

<sup>3</sup>Source: A map with explanatory notes supplied by the United States Children's Bureau and the United States Division of Vital Statistics.

WITH THE 1940 CENSUS



Source: U. S. Children's Bureau and U. S. Division of Vital Statistics.

## TABULATING AND INDEXING FACILITIES AND SERVICES

During the period of this report, the tabulating section used key punch, gang punch, and mechanical sorting machines and also a printing tabulator. As of January 1, 1940, an index punch card was adopted for birth, death, and stillbirth certificates in addition to the regular statistical punch card. The index cards contained sufficient information for use as follows:

For a current index of births, deaths, and stillbirths.

For making printed birth registers for the county health units, a service which can be extended to every county in the state if the demand arises.

For making all routine monthly reports on births, deaths, and stillbirths.

For issuing Notifications of Birth Registration.

For selecting certain cards, as occasion required, for reference to individual certificates.

For segregating cards by specific disease and identifying the individual cases.

The index punch card system made it possible to keep the index of births, deaths, and stillbirths current to within thirty days of the receipt of the certificates.

The work of the tabulating section greatly increased in the past few years because of rapid growth in services for other divisions of the State Division of Public Health. By the close of 1945, both routine and special tabulations were being performed for most of the divisions.

## WAR PERIOD BIRTH AND DEATH RATES

As published by the United States Division of Vital Statistics, the crude birth rate for Colorado residents was somewhat lower each of the five years 1940 through 1944 than the rates for residents of the mountain states as a group (Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming). The rates are shown in Table V. These rates are based on the estimated midyear civilian population within the boundaries of the areas, excluding both the armed forces overseas and the armed forces in the areas.

The federal report states that because of population movements during the war, crude birth and death rates did not have the same meaning as they had for previous years.<sup>4</sup> For this reason changes were made in the methods by which the rates were computed. It was concluded that exclusion of the armed forces from the population base used in calculating the crude birth rates for

<sup>4</sup>"Colorado, Summary of Vital Statistics, 1944," and "United States, Summary of Vital Statistics, 1944." *Vital Statistics—Special Reports, State Summaries*. United States Bureau of the Census, Vol. 24, No. 1 and No. 5, March 30, 1945, and May 10, 1946.

state and geographic regions yielded a "more stable and meaningful rate for interstate comparisons." On the other hand, the crude birth rates computed on this basis for states and regions are not comparable with the rate for the United States as a whole, which was based on the total population of the nation including the armed forces overseas. The rate for the United States (shown in Table V) is described as an index of the "extent to which the population of the nation is being increased by births."

For the crude death rates, the same type of population base was used for the state, regional, and national rates; and, therefore, three-way comparisons are possible. These rates are shown in Table VI for each year in the period 1940-1944. The number of deaths excludes those among the armed forces overseas; and all rates are based on the total population within the state, regional, or national area, including armed forces in the area but excluding those overseas. These rates are described as a crude measure of the "overall risk of death for the population living in the areas and the country as a whole." However, since the armed forces and deaths overseas were excluded, the rates cannot be considered as "an index of the total population decrease by death." As shown by Figure 10, the crude death rates for Colorado were from one per cent to 9 per cent higher than those for the United States; whereas the rates for the mountain states, as a group, were from 3 per cent to 10 per cent lower than the rates for the United States.

TABLE V  
NUMBER OF BIRTHS, COLORADO; AND CRUDE BIRTH  
RATES, COLORADO, MOUNTAIN STATES, AND UNITED  
STATES; BY PLACE OF RESIDENCE<sup>a</sup>, 1940-1944  
(Exclusive of stillbirths)

YEAR	Number of Births Colorado	Births per 1,000 Estimated Population		
		Colorado <sup>b</sup>	Mountain <sup>b</sup>	United <sup>c</sup> States
1940 .....	21,034	18.7	22.0	17.9
1941 .....	21,393	19.2	22.3	18.9
1942 .....	23,566	21.7	24.2	20.9
1943 .....	24,367	22.9	26.0	21.5
1944 .....	23,931	22.6	25.5	20.2

Source: Vital Statistics, Special Reports, State Summaries, U. S. Bureau of the Census, Vol. 22, No. 6, March 30, 1945, Tables A and B.

<sup>a</sup> Births are allocated by state of residence of the mother.

<sup>b</sup> Based on civilian population in the area.

<sup>c</sup> Based on total population, including armed forces in the United States and overseas. Not comparable with the rates for individual states and regions.

Note: The records of the State Division of Vital Statistics show a total of 23,228 births to Colorado residents in 1945, but the final total published by the federal agency will differ somewhat from this figure. The present figure gives a rate of 21.9 computed on the estimated midyear civilian population.

TABLE VI

NUMBER OF DEATHS, COLORADO; AND CRUDE DEATH RATES, COLORADO, MOUNTAIN STATES, AND UNITED STATES; BY PLACE OF RESIDENCE, 1940-1944

(Exclusive of stillbirths)

YEAR	Number of Deaths Colorado <sup>a</sup>	Deaths per 1,000 Estimated Population <sup>a</sup>		
		Colorado <sup>b</sup>	Mountain <sup>b</sup>	United <sup>b</sup> States
1940 .....	12,291	10.9	10.2	10.7
1941 .....	11,988	10.7	10.0	10.5
1942 .....	12,532	11.3	10.1	10.4
1943 .....	12,761	11.0	9.8	10.9
1944 .....	12,258	10.7	10.0	10.6

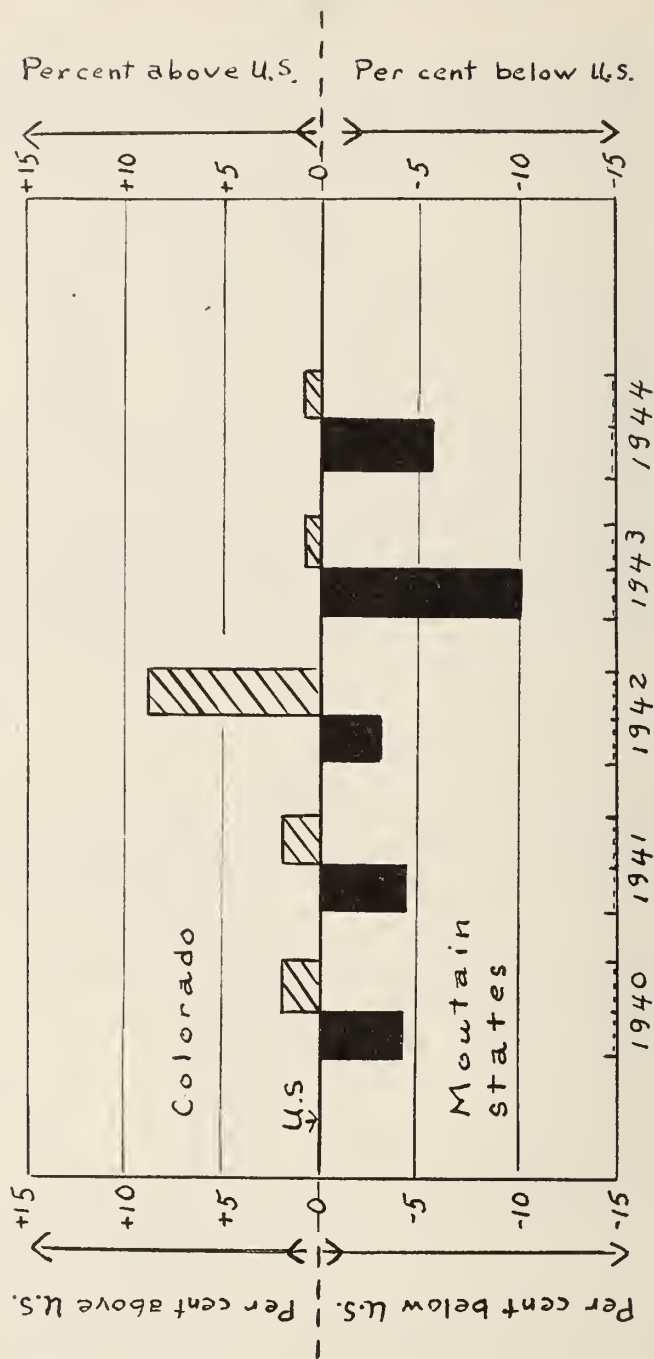
Source: Vital Statistics, Special Reports, State Summaries, U. S. Bureau of the Census, Vol. 22, No. 6, March 30, 1945, Tables A and B.

<sup>a</sup> Excludes deaths among the armed forces overseas.

<sup>b</sup> Based on total population in area, including armed forces in area; excludes armed forces overseas.

Note: The records of the State Division of Vital Statistics show a total of 12,074 deaths among Colorado residents in 1945, but the final total published by the federal agency will differ somewhat from this figure. The present figure gives a rate of 10.8 computed on the same type of population base used for the preceding 5 years.

Figure 10. PER CENT DIFFERENCE BETWEEN CRUDE DEATH RATE FOR THE UNITED STATES  
AND THE CRUDE RATES FOR COLORADO AND THE MOUNTAIN STATES  
1940-1944



## DIVISION OF VENEREAL DISEASE CONTROL

Venereal disease control activities in Colorado were greatly intensified in the period 1940-1945, as they were in the United States as a whole. The program in this state, implemented by funds authorized by Congress and allotted through the United States Public Health Service, was placed under the Division of Venereal Disease Control in 1941. Rigorous control measures agreed upon between the armed services, the agencies of social protection, and the State Division of Public Health were vigorously prosecuted for the protection of civilians and servicemen throughout the war period. Although shifts of professional personnel during the emergency resulted in several changes of director and of advisory nurse, there was no serious interruption of the control program. In the latter part of 1945, the directorship was filled by the temporary loan of a physician to Colorado by the United States Public Health Service.

### NATURE OF THE PROGRAM

By state law, all cases of venereal disease which are newly diagnosed, treated, or prescribed for (by doctors, hospitals, clinics, and the like), must be reported to the local health authorities; and by the latter to the State Division of Public Health monthly. Colorado health laws and regulations operative in the period of this report also required that blood tests for syphilis be taken of all applicants for marriage licenses and of all pregnant women attended by licensed physicians, and that all food handlers be examined annually for venereal disease. The number of cases of syphilis, gonorrhea, and the other three venereal diseases reported in 1945 are shown, by report source, in Table VII. It should be emphasized, however, that the magnitude of the control problem is not fully indicated by the table because statistics on reported new cases of venereal disease considerably underrepresent the true prevalence. For effective control of syphilis and gonorrhea, continuous case-finding programs are necessary in order to secure early diagnosis of infectious cases and provide prompt, adequate treatment.

The control program of this division during the period 1940-1945 included the following closely integrated activities:

- Promotion of case-finding by public health nurses and lay investigators.

- Investigation of "contacts," or persons exposed to venereal disease through individuals known to be in infectious stages.

- Free diagnostic laboratory services through the Division of Laboratories.

- Operation of clinics and rapid treatment centers.

- Assistance to private physicians through payments for diagnosis, the furnishing of free drugs, and provision of consultation services.

TABLE VII  
 VENEREAL DISEASE CASES REPORTED<sup>a</sup>, BY SOURCE OF  
 REPORT, COLORADO, 1945

DISEASE	Total	Source			
		Health Dept. V.D. Clinics <sup>b</sup>	Private Physi- cians	Army	Private Hos- pitals
All cases .....	5,153	2,699	1,726	650	78
Syphilis .....	2,398	891	1,374	60	73
Primary .....	350	112	198	39	1
Secondary .....	391	158	226	4	3
Early latent .....	609	235	351	10	13
Late latent .....	633	247	341	3	42
Late .....	332	102	212	4	14
Congenital .....	83	37	46	—	—
Gonorrhea .....	2,736	1,791	351	590	4
Other <sup>c</sup> .....	19	17	1	—	1

<sup>a</sup> Unduplicated count. Both residents and nonresidents of Colorado.

<sup>b</sup> Clinics and centers operating under official funds—local, state, or federal.

<sup>c</sup> Chancroid, *Granuloma inguinale*, *Lymphogranuloma venereum*.

Case-holding services by public health nurses and lay investigators to assure adequate treatment and to discover instances of recurrence of the disease.

Educational programs for professional and lay groups.

In-service training of public health nurses, laboratory technicians, lay investigators, and other venereal disease control workers.

As required by law, the State Division of Public Health distributes, through its Division of Maternal and Child Health, one-per-cent nitrate of silver ampules to midwives and physicians practicing obstetrics for the prophylaxis of gonorrhea of the eyes of the newborn (*Ophthalmia neonatorum*).

### TREATMENT FACILITIES AND METHODS

Facilities for the treatment of venereal disease in this state were greatly expanded during the period of this report. Three clinics organized in 1939—one at the Colorado General Hospital, one at the Denver General Hospital, and one in Colorado Springs—were the only units operating under public funds on January 1, 1940. By the end of 1945, however, the list of well-organized, active clinics of this type had grown to sixteen, thirteen new ones having been opened in Boulder, Fort Collins, Fort Lupton, Fowler, Greeley, La Junta, Las Animas, Leadville, Loveland, Ordway, Pueblo, Rocky Ford, and Trinidad.

Another valuable addition to the treatment facilities took place in February, 1943, when the Denver Rapid Treatment Center was formally organized. This center, which operates under the sponsorship of the United States Public Health Service in cooperation with the State Division of Public Health, is a unit of the national rapid treatment program. The center made possible the hospitalization of venereal disease patients and administration of complete treatment within a very short period of time. In February, 1944, the facilities for this state again were increased by the opening of a second rapid treatment center in Pueblo. This center operated for a full year and then was discontinued in favor of a unified center for the entire state, situated in Denver. From February, 1943, when the rapid treatment program was inaugurated in Colorado, through December, 1945, there were 3,905 admissions to rapid treatment of the venereal diseases. At the Denver center the admissions increased from 544 in 1943 to 865 in 1944 and 2,038 in 1945. There were 458 admissions to treatment at the Pueblo center during its one year of operation.

The advent of penicillin brought important changes in the treatment of the venereal diseases. Gonorrhea responded so well to this drug that penicillin treatment became the preferred method at the rapid treatment centers and also at the clinics. Since August, 1945, the practice—as a general rule—has been to reserve the unified Rapid Treatment Center in Denver for syphilis only and to treat gonorrhea on an out-patient basis in the clinic units throughout the state. Penicillin treatment for gonorrhea usually can be concluded within four to eight hours.

In the early period of the rapid treatment program, arsenicals alone were used for the treatment of syphilis. These drugs were administered by a slow, intravenous drip method on a schedule of less than ten days for complete treatment of infectious syphilis (primary, secondary, and early latent stages). In 1944, penicillin assumed the major role in the treatment of syphilis, with the arsenicals playing a small but important part in a ten-day schedule of complete treatment for primary, secondary, and early latent stages. For other stages (late latent, and late), the treatment schedule varies with the individual case. Penicillin, highly effective in controlling the infectivity of syphilis, is relatively nontoxic to the patient.

The rapid treatment program for syphilis considerably changed the character and volume of work done in the venereal disease clinics. It noticeably reduced the clinic patient-loads because the syphilis treatment ordinarily can be concluded at the Rapid Treatment Center within ten days, whereas formerly eighteen months of regular clinic attendance were required for adequate anti-syphilitic treatment. As a result of the lightened clinic load, personnel have had more time for intensive case-finding and for follow-up of treated cases to discover any recurrences of the disease.

## SYPHILIS CASE-FINDING AND ADMISSIONS TO TREATMENT

The number of selectees for military service found to have positive blood tests in examinations for syphilis gave a marked stimulus to case-finding. A positive blood test signifies the possibility of syphilitic infection or of certain other disease conditions. It calls for further study and medical determination as to whether or not there is infection.

Results of blood tests for syphilis secured from approximately the first two million selectees called in 1940 and 1941 were tabulated by the Selective Service for each state and county. For Colorado the study revealed a rate of 19.3 men with positive tests per 1,000 individuals examined (white and Negro men, 21 through 35 years of age, of known residence). For the United States as a whole, the rate was 45.0 per 1,000 men examined. Although Colorado ranked favorably in comparison with many of the states, the number of selectees with positive blood tests emphasized the existence of an important disease control problem in the state. The great distances and the wide dispersion of cases in sparsely populated states such as Colorado necessitate relatively great effort for effective control.

The number of positive blood tests found in syphilis examinations made by the Division of Laboratories under the Premarital, Prenatal, and Food Handler laws and regulations in 1945 are shown in Table VIII.

TABLE VIII  
POSITIVE BLOOD TESTS FOUND IN SYPHILIS  
EXAMINATIONS UNDER SPECIFIED REGULATIONS  
AND LAWS, DIVISION OF LABORATORIES, 1945

LAW	Total Tests	POSITIVE TESTS	
		Number	Rate per 1,000 Tests
Food handlers .....	27,667	707	25.6
Prenatal .....	20,283	165	8.1
Premarital .....	15,089	185	12.3

Throughout the period of this report, constant effort was directed toward increased and more thorough case-finding. As shown by Figure 11, the annual number of reported cases of syphilis increased rapidly from 1939 to a peak in 1943 and then declined abruptly.<sup>1</sup> In interpreting the chart, it should be kept in mind that improvement in case-finding may bring seemingly paradoxical results. At first, better case-finding automatically increases the

<sup>1</sup>Includes both residents and nonresidents of Colorado.

number of reported cases. In the long run, however, good case-finding when coupled with provision of adequate treatment should reduce the number of new cases currently reported, because relatively few remain to be discovered and because the spread of infection to other persons is being increasingly well controlled. These considerations make the decline in the number of cases reported after 1943 doubly interesting. It is encouraging to note the increasing proportion of cases reported in the infectious stages. From a ratio of somewhat less than one (.9) infectious case to every two noninfectious cases reported in 1940, the relationship had changed favorably by 1945 to well over one (1.3) infectious to every one noninfectious case.

Noninfectious syphilis results either from adequate treatment or from normal aging of the infection, infectivity terminating after about four years. Every possible effort must be made to find the cases early in the infectious stages and to provide prompt, adequate treatment if spread of the disease is to be controlled. Figure 12 shows the total new admissions to treatment for syphilis in health department rapid treatment centers and clinics<sup>2</sup> for the years 1939 through 1945, in relation to the number of admissions of cases in infectious stages.

### GONORRHEA CASES REPORTED AND TREATED

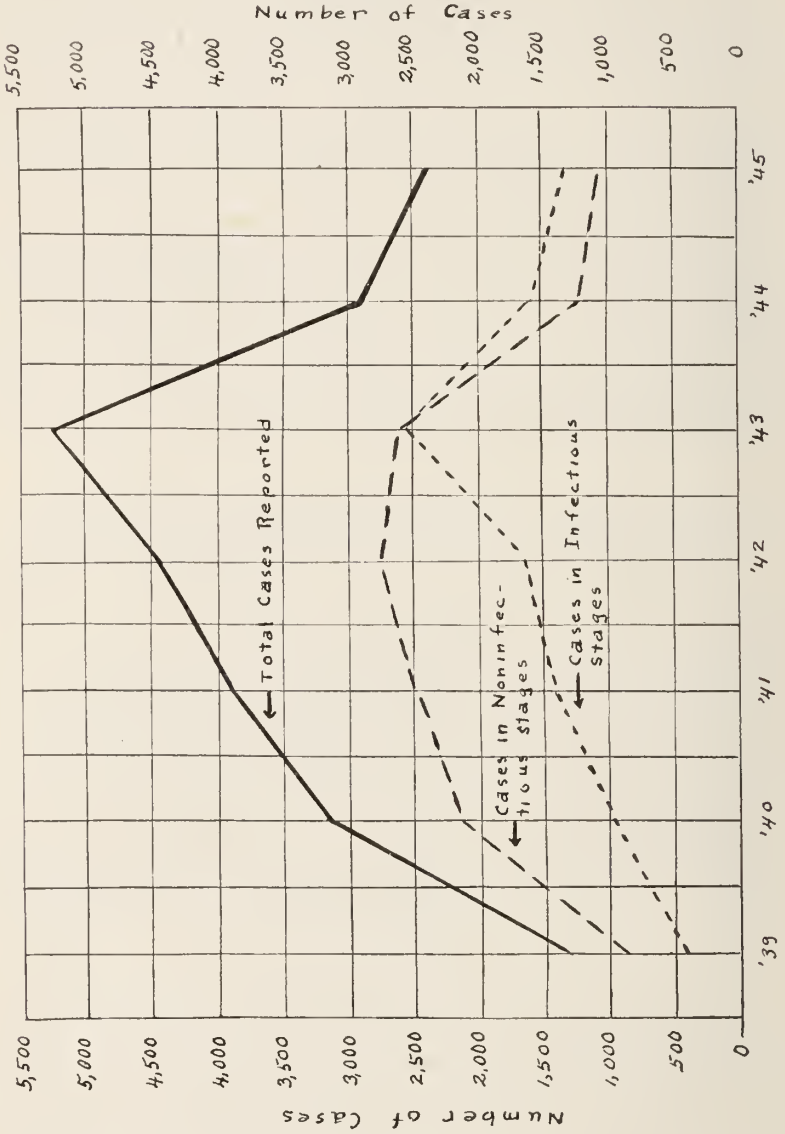
The annual number of gonorrhea cases reported in Colorado increased sharply during the early war years. The peak number was reached in 1943, as was true of syphilis cases. Figure 13 shows the number of gonorrhea cases reported in the years 1939-1945 and also the number of new admissions to treatment in health department centers and clinics.<sup>3</sup> Considerable improvement in case-finding and reporting in this field of communicable disease control clearly is needed. The prevalence of gonorrhea has been estimated by venereal disease authorities to be, in general, three times that of syphilis. In Colorado, however, gonorrhea reporting was so incomplete that far fewer gonorrhea cases than syphilis cases were reported in the period 1940-1943. In 1944 the reported cases of the two diseases were more nearly equal, and in 1945 the gonorrhea cases slightly exceeded the syphilis cases.

Gonorrhea is a highly infectious disease which brings sterility, arthritis, other disabilities, and sometimes death to men and women. It should be brought under treatment promptly in all possible instances because complications can be prevented better in the early than in the chronic stages. As shown by Figure 13, the number of admissions to treatment in health department centers and clinics increased greatly from 1942 through 1944 but declined somewhat in 1945.

<sup>2</sup>Clinics and centers operated under public funds; local, state, or federal.

<sup>3</sup>Includes both residents and nonresidents of Colorado.

Figure 11. SYPHILIS CASES REPORTED<sup>a</sup>, COLORADO  
1939-1945



<sup>a</sup> Includes both residents and nonresidents of Colorado.

Figure 12. SYPHILIS CASES NEWLY ADMITTED TO  
TREATMENT, HEALTH DEPARTMENT CLINICS  
AND CENTERS, COLORADO  
1939-1945

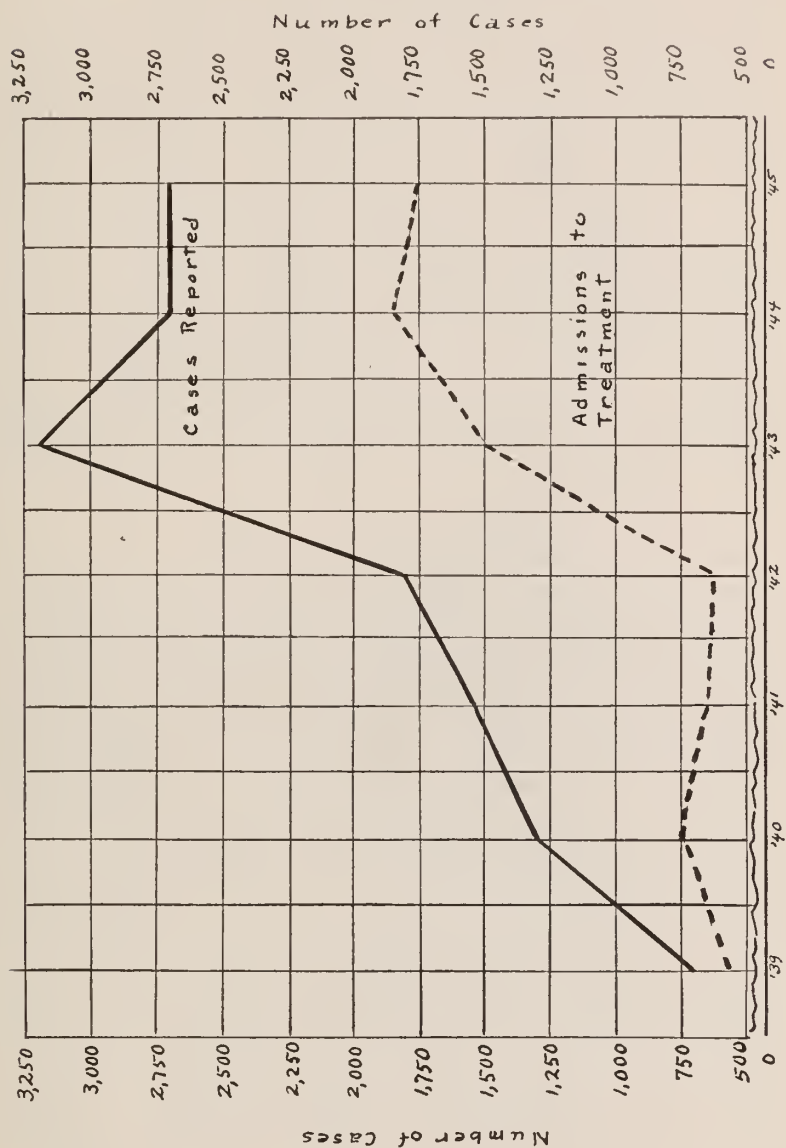
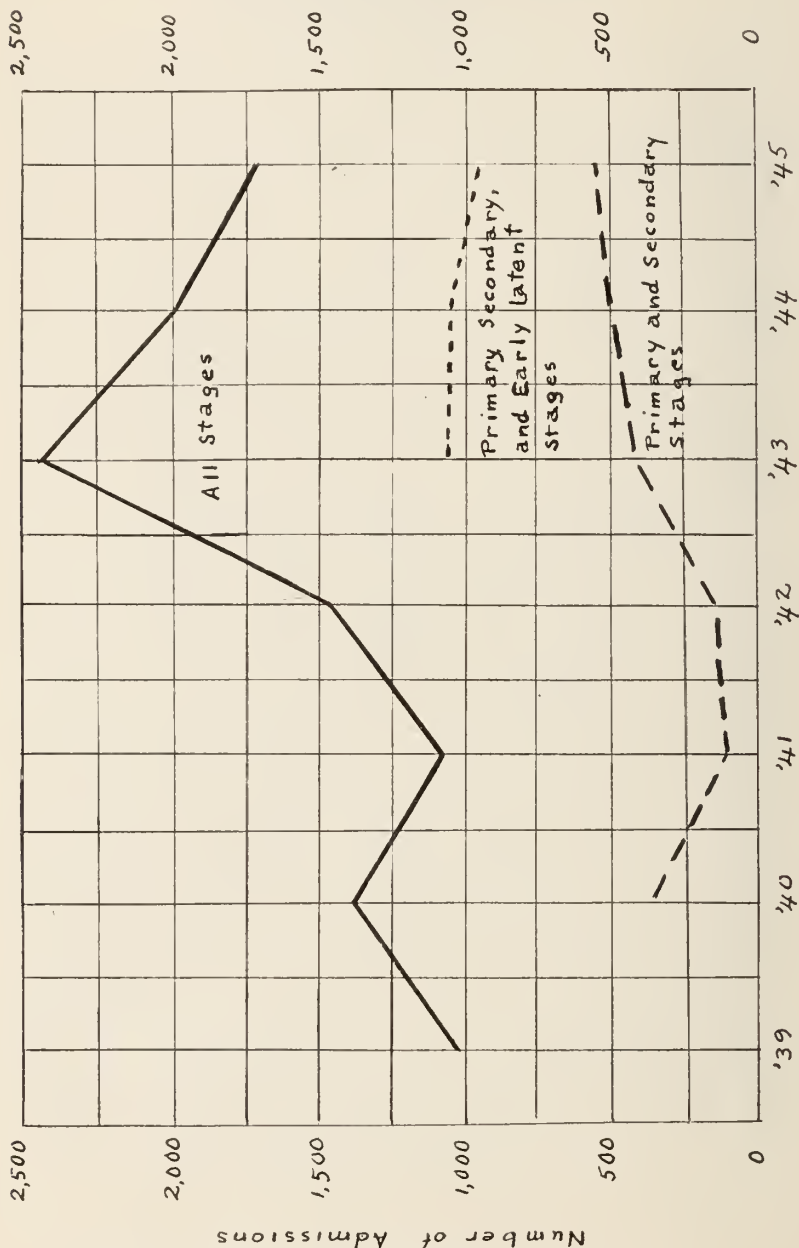


Figure 13. GONORRHEA CASES REPORTED<sup>a</sup> AND NEW ADMISSIONS TO TREATMENT, HEALTH DEPARTMENT CLINICS AND CENTERS, COLORADO, 1939-1945



<sup>a</sup> Includes both residents and nonresidents of Colorado.

## MILITARY SEPARATION PROGRAM

An important venereal disease case-finding program was put into operation as part of the process of demobilizing the armed forces. All personnel demobilized are carefully "screened" by the military services for venereal disease, and a blood test for syphilis is run for each man during his discharge medical examination. All suspicious blood tests found for individuals with no other evidence of syphilis are referred to the State Division of Public Health by means of reports. In turn, the Division of Venereal Disease Control forwards the reports, together with recommendations, to the local health agency of the veteran's prospective residence. Each individual is then interviewed in the local area by a public health nurse or skilled lay worker who urges him to seek medical decision regarding the possibility of a hidden syphilitic infection.

In addition, all medical documents relating to discharged servicemen are searched by the Division of Venereal Disease Control for a record of treatment of venereal disease. This confidential information is made available to the physician of the veteran's choice, on the physician's request. It is hoped that this program will prevent the veterans of this war from becoming victims of neglected syphilis and its consequences—casualties with heart disease, paralysis, or mental illness—as was far too frequent in the decade following World War I.

## CENTRAL CASE REGISTER

A definite step forward was taken in March, 1945, when a central register of venereal disease cases was established in the Division of Venereal Disease Control. The registry program is conducted in conformity with a nationwide plan developed by the United States Public Health Service for channeling, for investigation, "contacts" or persons exposed to infection through known venereal disease cases. Under this plan the results of the case-finding activities are tabulated as to disposition and outcome of each contact case reported for investigation.

In the six months July-December, 1945, a total of 2,782 suspected cases of exposure to venereal disease infection were reported for investigation. Sixty per cent of the individuals were found to be residents of the state and were located; 12 per cent were out of the state; and 28 per cent could not be located for various reasons. Of the 1,666 who resided in Colorado and were interviewed, 750 were found to be infected and requiring treatment. Of these infected persons, about 78 per cent were newly brought or returned to treatment; nearly 22 per cent already were under treatment; and only 4 persons remained untreated after 3 months had elapsed from date of referral for investigation.

Table IX shows the disposition of the total cases reported for investigation.

TABLE IX  
DISPOSITION OF CASES REPORTED FOR VENEREAL  
DISEASE INVESTIGATION, CENTRAL REGISTER  
COLORADO<sup>a</sup>, July-December, 1945

Disposition	Number	Per Cent
All cases reported for investigation.....	2,782	100.0
Not located .....	1,116	40.1
Unable to find .....	585	21.0
Out of state .....	322	11.6
Insufficient information .....	209	7.5
Located:		
Found infected and needing treatment .....	750	27.0
Brought or returned to treatment .....	584	21.0
Already under treatment .....	162	5.8
Not under treatment .....	4	.2
Found not infected, no treatment necessary..	493	17.7
Preliminary or temporary disposition .....	75	2.7
Other disposition .....	348	12.5

<sup>a</sup> In this table, the data on disposition refer to the status of each case 3 months after referral for investigation.

These case-finding results compare favorably with national percentages. Nevertheless, there is considerable room for improvement. It has been estimated that an average of three persons become exposed to each known case of infection. The contact cases must be found, examined, and treated if infected. For each known infectious case, it is probable that there are one or more infected contacts. Furthermore, the activities of the central register should be expanded in order to compensate for the diminishing volume of contact information available from the military services.

### EDUCATIONAL OBJECTIVES

The educational program of this division is conducted through a variety of public relations and educational activities in cooperation with other divisions. The principal objectives of the program are:

Development among physicians and nurses of greater awareness of signs and symptoms significant of venereal disease.

Educating individuals to seek, voluntarily, early medical treatment for venereal disease.

Encouragement of examination of apparently healthy groups, such as industrial workers, in order to detect venereal disease in early stages.

Furtherance of an open-minded, serious, and respectful attitude toward the scientific and social aspects of all problems of human life which relate to sex.

Provision of information on personal sex hygiene as part of the hygiene of the whole person, with special reference to the adolescent and the adult public.

Encouragement of personal responsibility regarding the social, ethical, and eugenic aspects of sex as it affects the individual in relation to other individuals of the present and future generations.

## DIVISION OF TUBERCULOSIS CONTROL

During the six-year period 1940-1945, this division endeavored to maintain and expand the tuberculosis control services throughout the state. Although difficulties were encountered in securing adequate personnel and equipment during the war years, the division "carried on" and enlarged its program.

### NATURE OF THE SERVICES

The expansion of services consisted, in the main, of increased efforts placed on case-finding and on follow-up examinations of discovered cases of tuberculosis, particularly of two large groups: (1) selective service examinees rejected because of tuberculosis, and (2) tuberculous persons discovered through use of a mobile X-ray unit. Acquisition of a mobile X-ray unit, equipped with a General Electric photo-roentgenographic machine to produce 4 x 5-inch chest films, was made possible by an appropriation of \$12,000 by the Thirty-fourth General Assembly and a supplementary grant of \$2,400 from the Colorado Tuberculosis Association. Funds for operating the mobile unit were secured largely from the Colorado Tuberculosis Association and the United States Public Health Service.

In addition to the expanded case-finding and examination services, the Division of Tuberculosis Control continued five other basic activities. These were:

- Education and information services regarding tuberculosis control for physicians, nurses, and the general public.

- Cooperation with other agencies, state and local, in the segregation and treatment of patients with open tuberculosis.

- Provision and promotion of public health nursing follow-up on all cases of tuberculosis and on "contacts," or persons exposed to the disease through known cases.

- Provision of diagnostic and consultation aid to physicians.

- Maintenance of a register of all known cases of tuberculosis among Colorado residents.

- Investigations and research on tuberculosis and allied problems.

### EDUCATION AND INFORMATION SERVICE

The educational program included lectures, exhibits, radio talks, distribution of pamphlets, newspaper articles, and articles in the *Colorado State Board of Health Bulletin*, a quarterly publication. The information service for the general public consisted mainly of cooperation with the Colorado Tuberculosis Association and distribution of materials supplied by the National Tuberculosis Association. This program was intensified and personalized by the public health nurses throughout the state.

A new educational program for the Spanish-American population of the state was instituted in 1945. In that year a health educationist-interpreter was employed to explain to the Spanish-Americans, in their own language, the reason for sanatorium care and the necessity of isolating tuberculous individuals under proper hygienic conditions. When treatment of a tuberculous patient is undertaken in the home, the interpreter transmits the physician's and nurse's instructions to the patient in an endeavor to make the treatment more effective. Through the organization of Spanish-American health groups, the health educationist-interpreter will endeavor to develop wider appreciation of the importance of adequate home and community sanitation and of modern public health methods in disease control. It is hoped that the Spanish-Americans not only will understand these problems but also will undertake measures to improve their health conditions.

In addition to giving talks and illustrated lectures on tuberculosis control, the director of the division wrote numerous articles, primarily for physicians. Most of these were published in the *Colorado State Board of Health Bulletin* or the *Rocky Mountain Medical Journal*. Among the articles were the following:

"Mass Tuberculin Testing and X-Raying."

"Colorado Tuberculosis Control Program."

"Tuberculosis Mortality in Colorado, 1938-1939."

"The Tuberculin Test, an Important and Practical Procedure for General Tuberculosis Survey Purposes."

"The Relationship of Tuberculin Sensitivity to Tuberculous Infection."

"Correct Chest X-Ray Technic and Interpretation, a Primary Necessity for the Diagnosis and Management of Pulmonary Tuberculosis."

"The Rapid Development of Clinical Tuberculosis in Tuberculin Positive Reactors Following Negative Physical and X-Ray Examinations of the Chest."

"The Development of Active Pulmonary Tuberculosis in a Positive Reactor 55 Years of Age."

"Follow-up of Colorado Selectees Rejected Because of Tuberculosis."

"Tuberculosis Mortality Statistics in Colorado."

## TUBERCULOSIS CASE-FINDING

Active and continuous case-finding clinics and X-ray surveys are important parts of an adequate tuberculosis control program. This is true because early clinical tuberculosis produces few symptoms and practically no physical signs. Consequently, case-finding clinics and X-ray programs afford the only practical methods of finding tuberculosis in the early active stages, when treatment can be successfully applied at a reasonable cost. During the years

1940-1945, the Division of Tuberculosis Control and the Colorado Tuberculosis Association continued their previously inaugurated case-finding clinic program and also instituted the mass chest X-ray survey made possible by the acquisition of the mobile unit.

In the six years, a total of 57,616 persons attended the regular case-finding clinics held in 52 of the 63 counties of the state. Of these persons, 39,432 received tuberculin tests, with 8,869 (22 per cent) reacting positively. Chest X-rays (14 x 17-inch) were taken of 15,897 persons, and 4,427 individuals were given physical examinations. More than one-half (2,437) of the physical examinations were of individuals with reinfection type tuberculosis, the "disease" form of the infection as distinguished from the primary, or non-clinical type.

The mass chest X-ray survey, utilizing the mobile X-ray unit, was started on July 1, 1944. It is hoped that by means of this program a large percentage of individuals with reinfection type tuberculosis will be discovered while their disease is still in the minimal stage. The results obtained during the first eighteen months of operation fully justify this expectation. (Figure 14.)

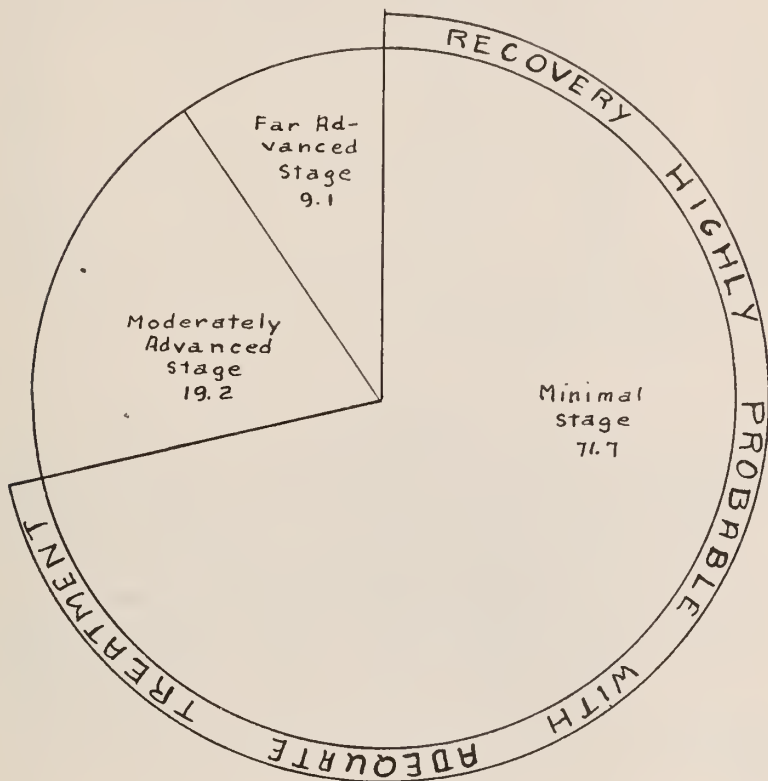
Through December 31, 1945, the mobile unit operated in 37 counties and took chest films of 41,663 individuals. In this group, 717 individuals (somewhat less than 2 per cent) had X-ray evidence of reinfection type tuberculosis. When these cases were classified according to stage of the disease, it was found that 514 (72 per cent) were minimal; 138 (19 per cent) were moderately advanced; and 65 (9 per cent) were far advanced. Approximately one-third of the individuals with reinfection type tuberculosis were found to need further sanatorium or medical care. Of the total individuals examined, 1,275 (with or without tuberculosis) showed X-ray evidence of one or more forms of pathology other than tuberculosis, as follows: silicosis, 239 males; cardiac disease, 255 individuals; other abnormalities, 781 persons. Tables X-XII give the chief findings in the survey from July, 1944, through December, 1945.<sup>1</sup>

## SEGREGATION AND TREATMENT OF TUBERCULOUS PERSONS

Throughout the six years covered by this report, isolation and treatment in sanatoria were strongly urged for all individuals with active tuberculosis. Sanatorium care for indigents was secured through cooperation with the State Department of Public Welfare, which, in Colorado, has charge of tuberculosis hospitalization for indigents. Isolation in the home was undertaken in instances of tuberculous individuals financially unable to pay for sanatorium care but not qualified for state aid; or when, for other reasons, sanatorium care could not be secured.

<sup>1</sup>For further information, see *Colorado State Board of Health Bulletin*, Vol. 10, No. 1, January, 1946.

Figure 14. REINFECTION TYPE TUBERCULOSIS  
PERCENTAGE ANALYSIS, BY STAGE, MOBILE  
X-RAY UNIT SURVEY, COLORADO  
July, 1944 - December, 1945



717 Reinfection Type  
Cases Found  
in Survey

TABLE X

PATHOLOGY FOUND, BY AGE-GROUP AND TYPE OF  
PATHOLOGY<sup>a</sup>, MOBILE X-RAY UNIT SURVEY, COLORADO  
July, 1944-December, 1945

Age-Group	Persons Examined			Reinfection Type			Silicosis (Males)	Cardiac Disease	Other Pathology
	All Groups	Spanish Americans	All Others	All Groups	Spanish Americans	All Others			
All Ages	41,663	3,658	38,005	717	65	652	239	255	781
Under 10	69	11	58	—	—	—	—	—	—
10-19	12,251	1,525	10,726	32	9	23	1	28	68
20-29	6,077	552	5,525	55	7	48	5	22	52
30-39	8,960	655	8,305	141	11	130	44	38	135
40-49	7,355	436	6,919	156	10	146	66	53	177
50-59	4,338	301	4,037	160	13	147	75	42	183
60-69	1,903	146	1,757	117	10	107	32	41	107
70 and over	565	28	537	49	5	44	16	29	56
Unknown	145	4	141	7	—	7	—	2	3

<sup>a</sup> Not an unduplicated count; individuals with more than one type of pathology were tabulated in each appropriate category.

TABLE XI

PERCENTAGE ANALYSIS: PATHOLOGY FOUND BY AGE-  
GROUP AND TYPE OF PATHOLOGY<sup>a</sup>, MOBILE X-RAY  
UNIT SURVEY, COLORADO, July, 1944-December, 1945

Age-Group	Per Cent of Persons Examined with Evidence of—					
	Reinfection Type Tuberculosis			Silicosis (Males) <sup>b</sup>	Cardiac Disease (Both Sexes)	Other Pathology (Both Sexes)
	All Groups	Spanish Americans	All Others			
All ages	1.72	1.77	1.71	1.32	.61	1.87
Under 10	—	—	—	—	—	—
10-19	.26	.59	.21	.02	.23	.56
20-29	.90	1.26	.86	.39	.36	.86
30-39	1.57	1.67	1.56	1.26	.42	1.51
40-49	2.13	2.29	2.11	1.86	.72	2.41
50-59	3.68	4.31	3.64	3.31	.97	4.22
60-69	6.14	6.84	6.08	3.08	2.15	5.62
70 and over	8.67	17.85	8.19	5.10	5.13	9.91
Unknown	4.82	—	4.96	—	1.38	2.07

<sup>a</sup> Not an unduplicated count; individuals with more than one type of pathology were tabulated in each appropriate category.

<sup>b</sup> Percentage calculated for males only.

TABLE XII

REINFECTION TYPE TUBERCULOSIS CASES, BY AGE-GROUP AND STAGE OF DISEASE, MOBILE X-RAY UNIT SURVEY, COLORADO, July, 1944-December, 1945

Age-Group	All Stages		Minimal		Moderately Advanced		Far Advanced	
	Number	Per Cent	Number	Per Cent	Number	Per Cent	Number	Per Cent
All ages	717	100.0	514	71.7	138	19.2	65	9.1
Under 10	—	—	—	—	—	—	—	—
10-19	32	100.0	28	87.5	1	3.1	3	9.4
20-29	55	100.0	35	63.6	11	20.0	9	16.4
30-39	141	100.0	104	73.7	19	13.5	18	12.8
40-49	156	100.0	107	68.6	35	22.4	14	9.0
50-59	160	100.0	119	74.4	30	18.7	11	6.9
60-69	117	100.0	85	72.7	26	22.2	6	5.1
70 and over	49	100.0	32	65.3	14	28.6	3	6.1
Unknown	7	100.0	4	57.1	2	28.6	1	14.3

### NURSING FOLLOW-UP ON CASES AND CONTACTS

Public health nursing follow-up on known tuberculosis persons and their "contacts" was undertaken in all counties where the local health department had a public health nurse. In this program, efforts were made to examine all "contacts" by tuberculin test, to X-ray all positive reactors, and to give physical examinations to all individuals whose X-rays showed shadows suggestive of reinfection type tuberculosis. The nursing follow-up on actual cases of tuberculosis stressed the importance of proper disposal of sputum, the necessity of maintaining hygienic conditions in the home, and the measures necessary to prevent spread of the disease in the community. As an aid in the care of patients in the home, a special pamphlet, *Tuberculosis of the Lungs, A Booklet for the Patient*, was prepared by this division.

Nursing follow-up was also made on all Colorado selectees rejected because of tuberculosis and also on all cases of tuberculosis discovered through the mobile unit survey.

### AID TO PHYSICIANS

The usual program of aid to physicians in connection with tuberculosis was maintained by this division during the years 1940-1945. This service included free interpretation of X-ray films of the chest whenever requested by Colorado physicians. The division also offered aid in the diagnosis of cases indicative of tuberculosis and, on request, made suggestions concerning the treatment of specific cases of tuberculosis. Laboratory examination of sputum both by smear and by culture is provided free through the Division of Laboratories.

## CENTRAL REGISTER

The Division of Tuberculosis Control maintains a central register of all Colorado residents reported as having tuberculosis, all tuberculous individuals discovered in the Mobile X-ray Unit Survey, all tuberculosis rejectees, and all tuberculosis patients discharged from tuberculosis sanatoria. The case details recorded in the registration file offer a means of studying various tuberculosis problems. The file also furnishes a record of removals of tuberculous individuals from one part of Colorado to another, as well as removals to other states. The information recorded in the file is held strictly confidential.

## INVESTIGATION AND RESEARCH

One of the most productive and far-reaching studies of tuberculosis in Colorado during the war years was that of the tuberculous rejectees reported to the Division of Tuberculosis Control by the Selective Service Headquarters in Colorado. The tuberculous men rejected through December, 1945, are classified by age-group and type and stage of the disease in Table XIII. Data by counties will be published in the July, 1946, issue of the *Colorado State Board of Health Bulletin*.

TABLE XIII

COLORADO SELECTEES REJECTED BECAUSE OF  
TUBERCULOSIS, BY AGE-GROUP AND TYPE AND STAGE  
OF DISEASE

Through December, 1945

Age-Group	Total	Reinfection Type Tuberculosis				Stable Tubercu- losis	Unknown
		All Stages	Minimal	Moderately Advanced	Far Advanced		
All Ages	1,670	666	258	225	183	696	308
15-19	118	44	22	19	3	57	17
20-24	227	84	33	22	29	105	38
25-29	329	147	63	45	39	124	58
30-34	355	147	54	46	47	130	78
35-39	280	116	36	39	41	121	43
40-44	127	69	20	35	14	49	9
45 and over	24	11	6	3	2	10	3
Unknown	210	48	24	16	8	100	62

The research program of the Division of Tuberculosis Control received great impetus with the acquisition of the mobile photo-roentgenographic equipment, permitting the mass X-ray examination of Colorado's urban and rural populations. The research value of the X-ray Survey is indicated by the statistics presented in the section on case-finding and in Tables X-XII.

In cooperation with the Division of Industrial Hygiene, this division conducted chest surveys of hard rock miners in Telluride and Leadville. These studies, which were made principally to determine the extent of silicosis in those areas, provided information of importance in industrial disease control.

## DIVISION OF RURAL HEALTH WORK AND EPIDEMIOLOGY

During the period 1940-1945, the Division of Rural Health Work and Epidemiology was especially handicapped by the fact that war conditions necessitated the resignation of the director on July 1, 1941. From that date onward, the administration of the division fell on the Executive Director of the State Division of Public Health and the Director of the Division of Tuberculosis Control. The war also resulted in a decrease in the personnel of the local health units and, consequently, limited the activities which could be performed adequately.

### COUNTY HEALTH UNITS

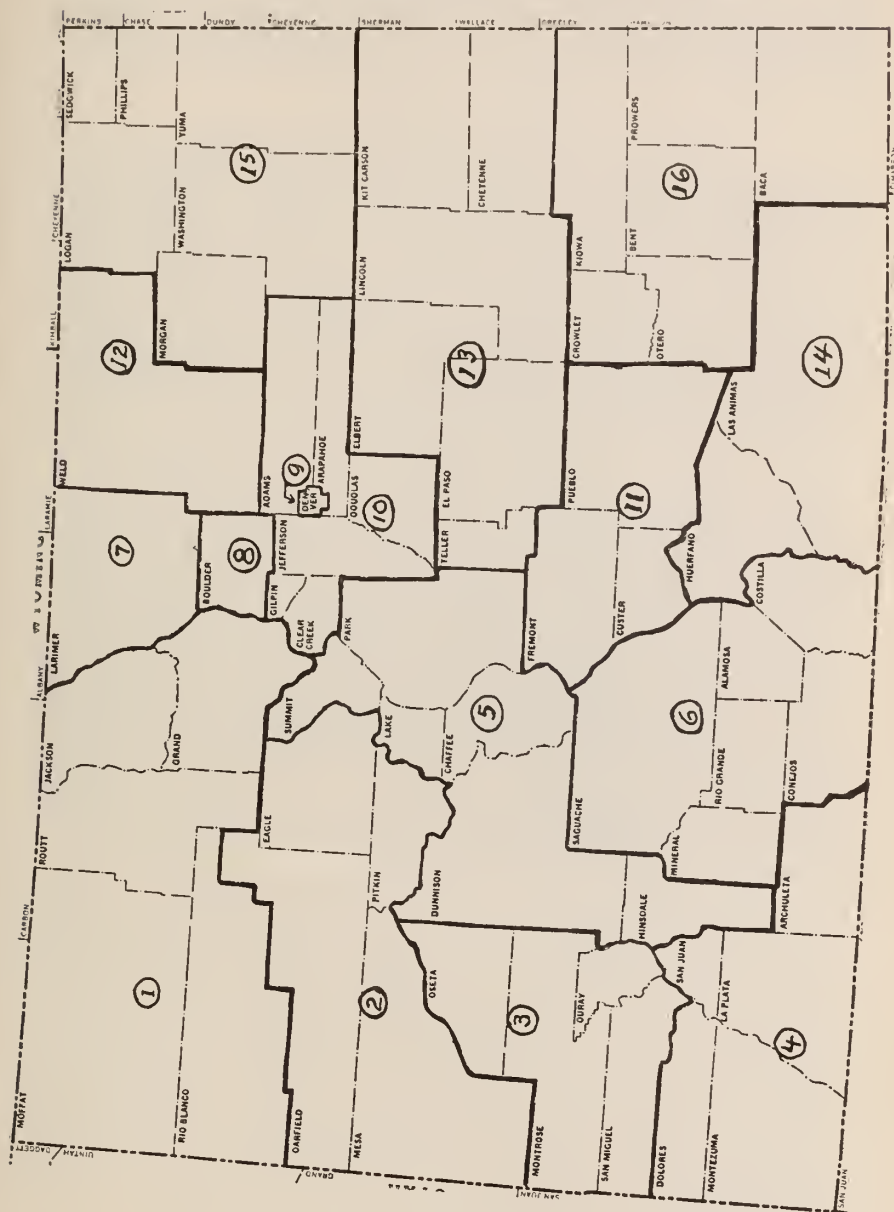
In spite of wartime difficulties, the three full-time county health units which were in existence in 1940 in Otero, El Paso, and Weld counties were kept intact throughout the six years 1940-1945. Furthermore, a new full-time unit was established in Las Animas County on July 1, 1944. Maintenance of local units was made possible by the assistance of the United States Public Health Service, which assigned federal personnel to Colorado in many instances.

Years of experience have demonstrated that the provision of even minimum health protection to a community requires the services of a full-time local health unit. The fact that Colorado has only four such units demonstrates one of the major inadequacies of the public health program in the state. The lack of sufficient, well-staffed units not only prevents the people in many areas from obtaining adequate health protection but also greatly handicaps any state-wide program which may be instituted. In fact, many excellently planned programs promoted by the State Division of Public Health have been almost neutralized because well-trained, public health personnel is not available to apply the programs in the communities.

Continual efforts were made during the period covered by this report to interest the people of the state in the necessity for full-time county or district health units. Considerable progress was made in this regard, and it is hoped that the next General Assembly will pass enabling legislation whereby cities and counties may unite to form districts of suitable size for local health administration. If such legislation is secured, it is anticipated that the state may be divided into some sixteen health districts, each of which will have sufficient population for economical operation of a good public health service for the inhabitants.

The map in Figure 15 shows sixteen local health districts suggested for Colorado by the Subcommittee on Health of the Governor's Postwar Planning Committee. These proposed jurisdictions average nearly 75,000 in population and range from 23,900 to

# POSTWAR PLANNING COMMITTEE



322,400. For Colorado, as for a number of western states, several districts of well below 50,000 inhabitants are included in the proposals because of the vast areas and natural barriers to communication. Usually, however, two basic premises in planning local health units are: (1) that it is uneconomical for places of less than 50,000 population to attempt to maintain full-time, adequately staffed health departments; and (2) that communities of 50,000 and over should be required to provide complete health service.<sup>1</sup>

### COMMUNICABLE DISEASE REPORTING

A basic epidemiological function of this division is the receipt and tabulation of weekly reports on communicable diseases from city health officials; county health units; military installations, either directly or through local officials; and physicians in areas for which local health authorities do not report. By law and by regulations of the State Division of Public Health, approximately 50 communicable diseases are listed as notifiable. All cases of Class I diseases—15 highly communicable and serious diseases such as, diphtheria, meningitis, poliomyelitis, scarlet fever, and smallpox—are reportable to local authorities within 24 hours; and about 35 Class II diseases are reportable within a week.

All cases of both classes of diseases are also reportable at least weekly to the State Division of Public Health on report forms and cards supplied currently to health officials and physicians by the Division of Rural Health Work and Epidemiology. Checks are made to see that reports come in regularly and promptly. The case entries are coded for machine tabulation; and, from the tabulations, required weekly telegraphic reports and typed monthly summaries are prepared for the United States Public Health Service. In addition, weekly mimeographed statements of the reported diseases are prepared and sent to local health officials, physicians, army posts, and other interested persons and agencies on a mailing list of more than 125 names. Exclusive of venereal diseases<sup>2</sup>, the cases among Colorado residents which were reported in the period 1940-1945 averaged 25,491 a year. The number ranged from 17,502 in 1940 to a maximum of 36,444 in 1943.<sup>3</sup>

This reporting system provides current statistics by which communicable disease incidence, prevalence above normal, indications of rising epidemics, and need for special control measures can be studied by federal, state, and local health officials. The State Division of Public Health also assists, as fully as personnel and facilities permit, in epidemiological investigations of various kinds. Several of the special services, such as the Division of Laboratories and the Milk Sanitation Section of the Division of Sanitary Engineering, cooperate in the investigations. Advice on communicable

<sup>1</sup>For a discussion of 15 health districts proposed by the American Public Health Association, see *Colorado State Board of Health Bulletin*, Vol. 9, No. 4, October, 1945.

<sup>2</sup>For data on venereal diseases, see the report of the Division of Venereal Disease Control.

<sup>3</sup>The tuberculosis cases include both residents and nonresidents.

disease problems and control methods is provided continuously by medical and other specialists of the State Division of Public Health through correspondence, telephone and office conferences, and special meetings called in regard to emergency situations. Public information concerning abnormally prevalent communicable diseases and suitable measures for their control is disseminated through the press and other channels.

### CASES REPORTED

The number of cases of communicable diseases among Colorado residents, other than venereal diseases, which were reported to this division in the six-year period, 1940-1945, are shown, by year and disease in Table XIV. Cases reported in 1945 are classified by month and by age-group in Tables XV and XVI.

In many of the disease categories there was irregular variation from year to year in the number of cases reported. Mumps cases were very numerous in 1940, whooping cough cases in 1941, and poliomyelitis cases in 1943<sup>4</sup>. Malaria cases reported by military installations in Colorado amounted to 843 in 1945, giving an unprecedented total of 846 for the state. Of the military cases, only one was contracted in the United States.

In 1940 there was a continuation of the earlier high incidence of smallpox, but thereafter the number of cases of this preventable disease remained at a particularly low level for Colorado. On the other hand, the amount of diphtheria remained high (for a preventable disease) throughout the period—an indication of the need for more extensive immunization programs. Another instance of the regrettable continuance of preventable diseases in this state is the number of cases of typhoid fever reported each year. The existence of so many cases of eradicable diseases year after year emphasizes the very real need for more of the protective health services that can be supplied effectively only through full-time local health units.

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<sup>4</sup>A report on poliomyelitis in 1943 was published in the *Colorado State Board of Health Bulletin*, Vol. 8, No. 2, April, 1944.

TABLE XIV  
COMMUNICABLE DISEASE CASES REPORTED<sup>a</sup>,  
COLORADO RESIDENTS, 1940-1945

DISEASE	Total	1940	1941	1942	1943	1944	1945
Total -----	152,946	17,502	31,705	19,971	36,444	27,589	19,735
Actinomycosis -----	4	—	—	3	1	—	—
Anthrax -----	2	1	—	—	—	1	—
Botulism -----	20	4	1	14	—	1	—
Chickenpox -----	22,859	2,400	4,395	2,579	4,268	4,761	4,466
Colorado tick fever -----	260	68	88	26	18	29	31
Diphtheria -----	2,113	357	452	387	380	253	284
Diphtheria carrier -----	2,042	451	458	373	190	259	311
Dysentery, amoebic -----	40	8	3	5	8	5	11
Dysentery, bacillary -----	383	90	26	98	123	30	16
Encephalitis, infectious -----	262	46	158	15	11	24	8
Encephalitis, secondary -----	59	14	28	4	10	3	—
Erysipelas -----	535	104	80	74	119	73	85
Food poisoning -----	140	3	—	32	54	—	51
Impetigo -----	107	—	—	—	15	36	56
Influenza -----	22,225	1,544	6,136	2,207	4,658	4,189	3,491
Leprosy -----	2	—	—	—	1	1	—
Malaria -----	920	3	2	3	30	36	846
Measles -----	37,167	1,526	8,676	6,371	13,016	6,746	832
Measles (German) -----	3,281	48	484	360	1,839	475	75
Meningitis (meningococcus) -----	293	8	13	28	98	98	48
Meningitis (lymphocytic) -----	3	3	—	—	—	—	—
Meningitis (tuberculous) -----	7	1	2	4	—	—	—
Meningitis (other) -----	66	9	13	13	13	11	7
Mumps -----	19,726	6,132	2,429	1,593	3,859	3,558	2,155
Pneumonia -----	8,058	1,219	897	1,285	1,862	1,704	1,091
Poliomyelitis -----	604	40	26	39	289	64	146
Rheumatic fever <sup>b</sup> -----	506	—	—	—	—	281	225
Rocky Mtn. spotted fever -----	81	11	21	16	12	8	13
Scarlet fever -----	10,072	1,384	1,064	1,201	2,017	2,171	2,235
Septic sore throat -----	501	107	43	34	30	35	252
Silicosis -----	1	1	—	—	—	—	—
Smallpox -----	320	243	41	13	8	10	5
Tetanus -----	8	3	1	2	1	1	—
Tick paralysis -----	1	1	—	—	—	—	—
Trachoma -----	31	13	6	6	4	2	—
Trichinosis -----	5	4	—	—	1	—	—
Tuberculosis (all forms) <sup>d</sup> -----	7,035	564	923	1,680	1,619	1,212	1,037
Tularemia -----	44	15	4	9	10	5	1
Typhoid fever -----	381	79	85	61	61	45	50
Typhoid carrier -----	11	—	5	1	1	3	1
Typhus fever -----	2	—	—	—	1	1	—
Paratyphoid -----	44	9	8	6	6	8	7
Undulant fever -----	252	50	36	12	43	48	63
Vincent's angina -----	556	46	36	60	122	118	174
Weil's disease -----	1	—	—	—	1	—	—
Whooping cough -----	11,916	893	5,065	1,357	1,645	1,284	1,672

<sup>a</sup> For data on venereal diseases, see the report of the Division of Venereal Disease Control.

<sup>b</sup> Rheumatic fever reportable as of May 1, 1944. Includes a few cases of related conditions.

<sup>c</sup> 843 cases reported by military installations (training establishments, hospitals, and prisoner of war camps), and 3 other cases.

<sup>d</sup> Tuberculosis cases in this table include both residents and nonresidents of Colorado.

TABLE XV  
COMMUNICABLE DISEASE CASES REPORTED, BY MONTH, COLORADO RESIDENTS, 1915

DISEASE	Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Total	19,367	2,600	1,972	1,674	1,638	2,269	1,107	763	801	526	992	1,964	3,061
Chickenpox	4,456	1,234	705	432	493	376	112	62	29	32	141	374	466
Colorado tick fever	31	26	29	20	22	11	18	2	—	—	—	—	—
Diphtheria	284	16	34	19	29	36	16	16	14	14	43	27	21
Diphtheria carrier	311	16	34	20	29	49	20	12	32	15	36	26	23
Dysentery, amoebic	11	—	—	—	—	—	—	—	—	1	—	—	8
Dysentery, bacillary	16	—	3	4	1	—	2	—	—	—	2	1	3
Encephalitis (infectious)	8	1	1	—	—	—	—	—	—	2	3	1	—
Erysipelas	85	12	6	14	9	6	2	10	6	6	5	4	5
Food poisoning	51	—	1	50	—	—	—	—	—	—	—	—	—
Impetigo	56	1	25	14	2	1	—	—	3	—	5	—	—
Influenza	3,491	107	127	90	39	51	135	49	39	27	137	900	1,790
Malaria	846	62	73	67	81	155	143	72	82	27	30	32	22
Measles	832	50	86	59	93	124	35	36	37	14	109	102	87
Measles (German)	75	8	8	11	18	6	7	4	3	—	1	5	4
Meningitis	48	11	8	2	3	3	1	1	6	3	4	3	3
(meningococcus)	7	1	—	—	3	—	1	—	—	—	—	1	—
Meningitis (other)	41	10	7	2	—	3	—	—	—	—	—	—	—
Mumps	2,155	230	165	265	316	642	163	86	39	35	56	45	113
Pneumonia	1,091	132	97	105	81	105	71	48	71	61	71	98	158
Poliomyelitis	146	3	1	—	—	1	2	4	46	54	21	11	8
Rheumatic fever <sup>a</sup>	225	32	13	17	13	42	23	7	18	8	16	14	22
Rocky Mtn. spotted fever	13	—	—	—	—	3	6	3	1	—	—	—	—
Scarlet fever	2,235	446	396	296	230	235	104	53	46	28	117	119	165
Septic sore throat	252	8	6	26	15	61	11	23	26	7	14	28	27
Smallpox	5	—	—	3	1	1	—	—	—	—	—	—	—
Tuberculosis <sup>b</sup>	669	25	29	36	41	161	90	55	57	27	55	48	45
(all forms)	1	—	—	—	—	—	1	—	—	—	—	—	—
Tularemia	50	3	—	3	1	2	—	7	7	6	9	8	2
Typhoid fever	1	—	—	—	—	—	—	—	—	—	—	—	—
Typhoid carrier	7	1	2	—	—	—	—	—	—	—	—	—	—
Paratyphoid	63	13	9	5	1	11	11	9	1	1	1	1	—
Undulant fever	174	32	19	16	16	21	13	15	10	4	10	5	14
Vincent's angina	1,672	146	128	121	130	166	119	188	233	154	103	108	76
Whooping cough	—	—	—	—	—	—	—	—	—	—	—	—	—

<sup>a</sup> Includes 2 cases of related conditions.<sup>b</sup> Excludes 368 nonresidents included in the number in Table XIV.

TABLE XVI  
SELECTED COMMUNICABLE DISEASE CASES, BY AGE-GROUP, COLORADO RESIDENTS, 1945

DISEASE	Total	Under 1	AGE IN YEARS															65 and over	Un- and known
			1	2	3	4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	
Total	6,148	165	139	187	199	189	1,152	631	507	643	693	373	256	168	114	107	92	69	268
Colo. tick fever	31	—	—	—	—	—	3	—	1	1	2	4	3	2	3	2	1	3	6
Diarrhea and enteritis	6	—	1	—	—	—	1	2	—	1	—	—	—	—	—	—	—	—	—
Diphtheria	284	8	12	20	22	22	53	32	34	21	14	16	7	5	5	4	3	—	8
Dysentery, amoebic	11	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	—	—	8
Dysentery, bacillary	16	1	1	2	—	—	3	—	—	2	1	—	—	1	1	1	—	—	2
Encephalitis (infectious)	8	1	1	—	—	—	1	2	—	—	—	2	—	—	—	—	—	—	1
Erysipelas	85	1	—	—	—	—	—	5	2	4	—	2	5	7	5	9	6	9	3
Food poisoning	51	—	—	—	—	—	—	1	25	24	1	—	—	—	—	—	—	—	—
Malaria	846	—	—	—	—	—	—	—	13	275	342	134	69	9	2	1	—	—	1
Meningitis (meningococcus)	48	10	4	2	3	1	7	3	2	3	1	2	—	3	—	2	1	2	2
Meningitis (other)	7	—	1	—	1	—	—	—	3	—	—	1	—	1	—	—	—	—	—
Paratyphoid	7	1	—	—	—	—	—	2	—	—	—	1	1	—	—	—	—	—	—
Pneumonia	1,091	129	66	34	33	27	58	37	64	87	79	48	57	45	36	40	37	31	136
Poliomylitis	146	1	7	13	8	12	44	29	12	8	7	2	1	1	—	—	—	—	1
Rheumatic fever <sup>a</sup>	223	—	—	3	6	6	79	51	24	12	8	3	3	5	1	1	—	—	21
Rocky Mountain spotted fever	13	—	—	—	—	—	—	1	3	—	—	1	1	—	—	1	3	2	1
Scarlet fever	2,235	12	47	110	122	115	867	439	247	77	57	38	29	13	4	2	3	2	51
Septic sore throat	252	—	—	—	2	4	7	9	41	42	60	7	5	4	2	2	2	—	64
Smallpox	5	—	—	—	—	—	4	—	—	—	—	—	—	1	—	—	—	—	—
Tuberculosis (all forms) <sup>b</sup>	669	1	—	1	—	—	3	6	25	81	106	103	65	62	48	39	33	20	49
Tularemia	1	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—
Typhoid fever	50	—	—	1	3	2	13	7	8	3	6	1	3	1	—	—	—	—	1
Undulant fever	63	—	—	—	—	—	8	5	3	2	8	8	7	8	6	1	3	—	4

<sup>a</sup> Excludes 2 cases of related conditions included in the number in Table XIV.

<sup>b</sup> Excludes 368 nonresidents included in the number in Table XIV.

## DIVISION OF MATERNAL AND CHILD HEALTH

Many changes took place in the maternal and child health program in Colorado in the six years 1940-1945. After 1940, the demands of war cut the personnel to such a degree that in many areas only partial service could be given. The inauguration, in 1943, of the Emergency Maternity and Infant Care Program for wives and infants of servicemen in the four lowest pay grades placed an additional load on the division<sup>1</sup>. Nevertheless, considering the depleted staff, a creditable record was achieved.

### NATURE OF THE PROGRAM

As originally planned, the program in operation in 1940 was designed to contribute to progressive improvement in the saving of mothers' and babies' lives and to result in optimal health for mothers and infants in many areas of the state. The plan—developed through medical, dental, public health nursing, and medical-social consultation—provided for demonstrations of complete maternity care in three areas of the state and for one or more of the following services in other areas: prenatal and postpartal clinics; immunization, dental, and eye clinics; home delivery nursing and public health nursing services; payment for medical and hospital care for medically indigent patients (one demonstration area); provision, upon request, of one-per-cent silver nitrate ampules to physicians and midwives throughout the state and of biologicals for immunization against smallpox, diphtheria, and typhoid fever.

As stated in the report of the Division of Public Health Nursing, the Emergency Maternity and Infant Care Program in Colorado provided medical, hospital, dental, and public health nursing care for maternity cases among wives of servicemen in the four lowest pay ranks. (The program is briefly designated the EMIC program.) Infants received medical care under this program only in the event of illness or special need, but public health nursing services for the infants were less restricted. Authorization of the medical and hospital care and referral of patients to doctors and hospitals of their choice was a responsibility of the Division of Maternal and Child Health, as was general supervision of the public health nursing services for the EMIC cases. The following figures on the EMIC cases, in the state as a whole, for which paid medical care was completed in 1945 are illustrative of the volume of service provided under this program: maternity cases, 4,845 (including 991 cases closed before delivery); infant cases (care of illness within the first year), 722.

Licensing and inspection of hospitals and of nursing and convalescent homes was begun in 1939 as a function of the State Division of Public Health. This activity was continued throughout the period covered by this report, under the Division of Maternal and Child Health.

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<sup>1</sup>See the report of the Division of Public Health Nursing.

Major programs and accomplishments of the division are discussed below. Statistics on nursing, health conference, and immunization services are presented, by year and specific program or group served, in Table XVII.

TABLE XVII  
SUMMARY OF MATERNAL AND CHILD HEALTH NURSING,  
HEALTH CONFERENCE, AND IMMUNIZATION SERVICES,  
COLORADO<sup>a</sup>, 1940-1945

TYPE OF SERVICE	Total	1940	1941	1942	1943	1944	1945
Maternity nursing <sup>b</sup>							
Prenatal home nursing:							
Admissions -----	2,504	707	611	487	403	178	118
Visits -----	25,641	5,504	4,113	4,226	3,739	4,652	3,407
Visits per person -----	2.1	2.4	2.4	2.5	2.0	1.7	1.6
Postpartal home nursing:							
Admissions -----	10,466	2,065	1,553	1,514	1,574	1,999	1,761
Visits -----	29,357	7,324	4,842	4,392	4,600	4,659	3,540
Visits per person -----	2.8	3.5	3.1	2.9	2.9	2.3	2.0
Prenatal clinic nursing:							
Admissions -----	2,504	707	611	487	403	178	118
Visits -----	7,630	2,341	2,051	1,447	974	525	292
Visits per person -----	3.0	3.3	3.4	3.0	2.4	2.9	2.5
Postpartal clinic exams --	1,222	358	340	212	172	95	45
Child health conferences							
Preschool children:							
Admissions -----	6,229	1,320	1,273	809	745	834	1,248
Visits -----	17,133	4,676	4,376	1,596	1,544	1,913	3,078
Visits per child -----	2.8	3.5	3.4	2.0	2.1	2.3	2.5
Infants:							
Admissions -----	3,312	692	533	471	470	566	580
Visits -----	9,722	2,009	1,935	1,316	1,197	1,529	1,736
Visits per infant -----	2.9	2.9	3.6	2.8	2.5	2.7	3.0
Immunizations:							
Vaccinations for smallpox	63,301	11,183	7,333	10,469	8,050	16,271	9,995
Diphtheria immunizations	48,307	8,867	9,195	7,555	6,524	8,138	8,028
Under 1 yr. old -----	3,434	553	765	962	395	398	361
1 - 4 years -----	12,549	1,674	2,863	2,152	1,742	2,073	2,045
5 and older -----	32,324	6,640	5,567	4,441	4,387	5,667	5,622
Home nursing for preschool children and infants <sup>b</sup>							
Preschool children:							
Admissions -----	22,383	3,591	3,200	4,145	3,607	3,507	4,333
Visits -----	40,141	7,085	6,274	8,530	6,044	5,398	6,810
Visits per child -----	1.8	2.0	2.0	2.1	1.7	1.5	1.6
Infants:							
Admissions -----	19,893	3,220	2,586	3,041	3,454	3,874	3,718
Visits -----	54,046	10,762	8,148	8,741	9,581	9,073	7,741
Visits per child -----	2.7	3.3	3.2	2.9	2.8	2.3	2.1

<sup>a</sup> With a few exceptions, services reported by full-time public health nurses employed under official funds, exclusive of the cities of Denver and Pueblo.

<sup>b</sup> In addition to nursing services shown in this table, considerable public health nursing service was given through office visits. In 1945, office visits by maternity patients totaled 364 and office visits of infants and preschool children totaled 1,880.

<sup>c</sup> Excludes 47 visits for home delivery service which are included in Table IV.

## MATERNAL MORTALITY

Maternal mortality rates for Colorado have shown an encouraging downward trend for many years, as have the rates of the United States as a whole. However, with one exception, the rates for Colorado in the five years 1940-1944 were higher than those for the United States, as shown below:

Year	Maternal Deaths per 1,000 Live Births <sup>2</sup>	
	Colorado Residents	United States
1940.....	4.1	3.8
1941.....	3.4	3.2
1942.....	1.9	2.6
1943.....	2.6	2.5
1944.....	2.5	2.3

Continuance and expansion of programs directed toward the saving of mothers' lives are essential if the low maternal mortality rates prevailing in some parts of the country are to be achieved in this state.

## DEMONSTRATIONS OF COMPLETE MATERNITY CARE

The demonstrations of complete maternity care were the most comprehensive programs attempted. The first demonstration unit, established in Otero County in 1938, remained active throughout the period of this report, with the exception noted later. The services included nursing at home deliveries, prenatal and postpartal clinics in four centers in the county, public health nursing services both in the clinics and in the homes, either individual or group teaching in prenatal care, and child health conferences; as well as the usual services included in a generalized public health nursing program. In the spring of 1945, the home delivery nursing service was discontinued because of the shortage of nursing personnel.

The Maternity Pay Plan, initiated in 1940, was a special feature of the Otero County demonstration. The plan provided medical and hospital care for indigent cases showing complications and physicians' services at home deliveries for other medically indigent patients. In 1941 provision was made for dental care of women accepted under the Maternity Pay Plan. Medical social service was a necessary part of the program.

A second demonstration was developed in Las Animas County in 1938. In this area the demonstration was not part of a full-time health unit's services, as in the other two demonstrations. Nevertheless, the services offered were the same as those given in Otero County, except that there was no medical or hospital payment plan. The demonstration was discontinued in the spring of 1941.

Beginning in 1939, the Fort Lupton area of the Weld County Health Department was used for a third demonstration. Complete

<sup>2</sup>*Vital Statistics—Special Reports, State Summaries*, United States Bureau of the Census. Vol. 22, No. 6, March 30, 1945, Table A, p. 112.

maternity care was provided, with the exception of the payment plan. This demonstration unit was discontinued in 1944.

The large number of births occurring in family homes in the early years of the complete maternity care demonstrations indicated that home delivery nursing service was a logical and important part of the maternal health program. From January, 1940, through December, 1945, when all home delivery nursing services had been discontinued, a total of 2,766 births in homes were attended by public health nurses as part of the demonstration services, as follows: 861 in 1940, 555 in 1941, 500 in 1942, 518 in 1943, 285 in 1944, and 47 in 1945. Among the factors which operated to reduce the amount of this type of service were the growing scarcity of nurses in rural areas and an increasing proportion of hospital deliveries. The advent of the EMIC program no doubt contributed greatly to the increase in hospitalization.

Although the need for a home delivery nursing service now appears less great than it did some years ago, many births still occur in family homes and in maternity homes not equipped or staffed to give fully standard service. These births present a problem for those interested in safe maternity care. The solution may lie in three courses of action: (1) payment plans for those who have home deliveries because they cannot afford hospital care, (2) expansion of hospital facilities to areas not now served, and (3) provision of home delivery nursing services where hospital care is not available.

## SERVICES FOR PRENATAL AND POSTPARTAL PATIENTS

The number of women admitted to prenatal home nursing visits by public health nurses reporting to this division decreased greatly from 1940 through 1942. Then, with the EMIC program in operation by the latter part of 1943, the number of admissions to this type of service increased greatly. On the other hand, visits per person necessarily declined during the war years when the individual nurses were carrying very heavy case-loads. EMIC cases in areas of the state not receiving public health nursing service and those in the cities of Denver and Pueblo<sup>3</sup> were sent pamphlets on prenatal care and infant care routinely.

Admissions to postpartal services in the home increased somewhat less greatly after 1942 than admissions to prenatal home nursing did. There were probably two factors tending to hold down the admissions to postpartal home nursing service: (1) the gradual closing of home delivery nursing services in the demonstration units reduced the postpartal follow-up visits in the homes, and (2) hospital delivery service for EMIC cases decreased the number of postpartal nursing visits required for these patients at home.

<sup>3</sup>These two areas, which do not report their public health nursing services to the state Division of Public Health Nursing, administered their own nursing service for EMIC cases.

In the years 1940-1945, improved economic conditions and the EMIC program lessened the need for the prenatal and postpartal clinics developed earlier for patients unable to pay for medical care. In some areas the clinics were closed but in others, especially where there were large concentrations of farm labor, this type of service was continued.

### INFANT MORTALITY

In the period 1940-1945, the infant mortality rates for the state continued on the downward course evident in previous years. Nevertheless, the rates for Colorado remained high in comparison with those for the United States.

Year	Deaths under One Year of Age per 1,000 Live Births <sup>4</sup>	
	Colorado*	United States
1940.....	60.4	47.0
1941.....	52.0	45.3
1942.....	49.7	40.4
1943.....	50.4	40.4
1944.....	49.4	39.8

\*Deaths allocated by residence of mother.

The maternal health activities described above also contributed indirectly but greatly to infant health. In addition, the division conducted numerous programs designed specifically to improve the health and well-being of infants and children.

### CHILD HEALTH SERVICES

One of the most important child health activities of this division is the development and maintenance of child health conferences. These are permanent centers where parents may come at regular intervals for medical and nursing supervision in protecting the health of babies and young children. The program emphasizes prevention, and through the conferences the parents are trained to seek medical and nursing guidance regularly and to obtain any needed medical treatment promptly. Throughout the period of this report, child health conferences were maintained in scattered areas of the state. Because of wartime conditions, however, it was necessary to close some of the conferences for a time; and there was a loss both in admissions and in visits per child from 1940 through 1943. Then, with the opening of new conferences in the next two years, the volume of service rose toward the 1940 level. The future goal is to have child health conferences in all population centers in the state.

Immunization clinics were conducted in connection with most of the child health conferences. Generally, the immunization clinics were organized through the schools either by public health nurses or local, interested organizations like the American Legion Auxil-

<sup>4</sup>Source stated in footnote 2.

itary or the Parent-Teacher Association. For this reason, the emphasis was on immunization of children of school age. Parent education as to the importance of immunization of infants is needed. This might be accomplished, in cooperation with vital statistics offices, by mailing immunization information to parents of infants at six months of age.

Eye clinics were held in cooperation with the State Ophthalmological Society in thirteen different centers giving service to sixteen counties. All preschool and school children were eligible for diagnostic service, but refractions were confined to children of families unable to pay for this service.

Dental clinics and other dental health programs, originally under the administration of this division, were conducted by the new Division of Dental Health after 1940. The programs are described in the report of that division.

It is the public health nurses who carry to parents in the home the message of good health for children. Home nursing visits for infants and preschool children were provided at a fairly high level throughout the six years covered by this report, although visits per child necessarily decreased in the latter half of the period.

Considerable public health nursing service also was given through office visits.

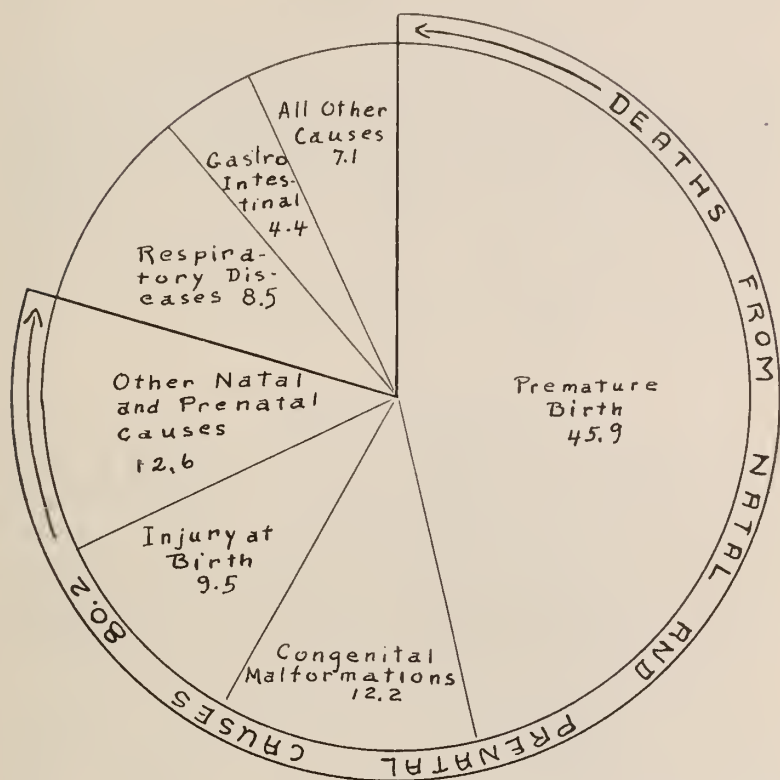
## SERVICES FOR NEWBORN AND PREMATURE INFANTS

In 1941 portable incubators were built and supplied to full-time health units and to public health nurses in other areas of the state.

The causes of infant deaths were analyzed from tabulations based on the death certificates of all infants (of Colorado residents) dying in 1944 under the age of one year<sup>5</sup>. Nearly two-thirds (62 per cent) of the deaths occurred in the first month of life, and further analysis showed that almost one-half (46 per cent) of these neonatal deaths were ascribed to premature birth (Figure 16). Because of the predominance of prematurity as a cause of neonatal deaths, the advisory nurse in maternal and infant health was given special training, in 1944, in the care of the premature. Her services were then made available to all public health nurses in the state for the demonstration of safe home care of the premature. In addition, the nursery supervisors in Denver hospitals, together with the advisory nurse, formed a committee on the provision of safe care for the premature as well as for all newborn infants in Denver. A practical outcome of the committee's work was a manual of safe nursing techniques in nurseries for the newborn. For the continued improvement of care of the newborn, the provision of a hospital consultant nurse was recommended.

<sup>5</sup>As shown by the records of the state Division of Vital Statistics.

Figure 16. CAUSES OF NEONATAL DEATHS  
PERCENTAGE DISTRIBUTION,  
COLORADO, 1944\*



Births to Colorado  
Residents

\* Special study based on 1944 deaths.

## EDUCATIONAL SERVICES

This division plans to keep current books, movies, and pamphlets on maternal and child health subjects available in the library of the State Division of Public Health. These may be borrowed by public health workers and by laymen. Equipment for projecting movies and slides also is available. A proposed expansion of the educational services of this division is consultation with public libraries concerning child and maternal health literature for laymen.

May Day is observed each year as Child Health Day in cooperation with the United States Children's Bureau. Arrangements are made for the distribution of educational materials and for newspaper and radio publicity on child health or child welfare subjects selected for emphasis in the particular year. In 1945 the subject emphasized was birth registration. Literature supplied by the Children's Bureau and the United States Division of Vital Statistics gave the results of a test of the completeness of birth registration which was made in connection with the 1940 census of population. The figures for Colorado indicated that great improvement was needed in numerous counties<sup>6</sup>.

## LICENSING AND INSPECTION OF HOSPITALS AND NURSING HOMES

This program was developed as fully as possible under the wartime conditions in 1940-1945. Regulations adopted by the State Board of Health in 1939 set the standards for licensing of Class A and Class B general hospitals, general limited hospitals, maternity hospitals and homes, and convalescent homes. Revision in 1942 added requirements as to the use of pasteurized milk, regulations concerning convalescent homes for the care of tuberculosis patients; and rules requiring that narcotics be kept under lock and specifying the type of records to be kept in institutions using narcotics.

During the six years, all known hospitals and homes were visited and inspected. Those not meeting standards either were requested to make improvements that would enable them to be approved and licensed or were advised to close. In December, 1945, licenses were held by 222 hospitals and homes as follows: 100 general hospitals, including 12 osteopathic hospitals; 90 convalescent homes; 16 maternity homes; 14 tuberculosis sanatoria; and 2 mental hospitals.

When the inspection and licensing program was started it was found that many establishments had functioned for years as "nursing homes," accepting all types of cases and often caring for maternity cases and patients with infectious conditions at the same time. Since then safe standards for maternal and infant care have been taught, and maternity homes have been limited to the care of maternity patients. Every effort also has been made to

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<sup>6</sup>See report of the Division of Vital Statistics.

provide better care for newborn and premature infants in hospitals and maternity homes.

Many hospitals had plans for expansion of existing facilities after the war. Numerous new hospitals also were contemplated, and in some counties associations were formed for that purpose. The inspector of hospitals checked plans, and consultant services were provided to architects in order that the new buildings may meet requirements of the State Board of Health and provide facilities for safe and convenient care of patients. Special consultation services were given by the advisory nurse concerning plans for new maternity divisions or maternity hospitals.

In 1944 the inspector of hospitals cooperated in the survey of sanitary and health conditions at eleven state institutions which was conducted by the State Division of Public Health at the request of the Governor and the General Interim Committee of the legislature.

## DIVISION OF CRIPPLED CHILDREN

This report of activities of the Division of Crippled Children during the six years 1940-1945 should be read in the light of the exigencies of the war period. By 1945, the professional staff had been reduced to about one-third of its 1941 strength; while, in the meantime, the number of children served had increased greatly.

### NATURE OF THE SERVICES

The goal of the program of the division, started in 1936 under Title V of the Social Security Act, is to provide the maximum care required for crippled children who would not otherwise receive adequate treatment through their parents or charitable organizations. The term "crippled child" originally was defined as follows:

A crippled child shall be considered to be a person under twenty-one years of age who has some remediable deformity or disease of the skeletal system, articulations or related structures of a chronic nature or tending toward chronicity.

Harelip and cleft palate were included under the definition from the outset of the program, and in 1938 the definition was enlarged to include certain types of remediable eye conditions such as congenital cataracts and traumatic cataracts.

In the period covered by this report the Federal Government provided about sixty per cent of the funds for the program for crippled children in this state. The federal funds are allocated to the State Division of Public Health through the United States Children's Bureau. The Division of Crippled Children, in turn, provides advisory public health nursing services, conducts clinic examination programs, and arranges for treatment. In 1940, the state was divided into three areas, with an advisory nurse serving each. Since 1942, however, the state has been covered by only two advisory nurses, one working out of the Denver office and the other from the Pueblo office of this division.

Whenever possible diagnostic examinations are given in clinics conducted in the districts where the handicapped children live. Orthopedic specialists and a clinic staff visit each area periodically to give diagnostic and follow-up services. However, when an emergency exists arrangements may be made for immediate examination and treatment. Cost of treatment may be borne partly or entirely by the division, or the case may be referred to some other organization interested in providing care for crippled children. As provided by the Social Security Act, emphasis is placed on services for children living in rural areas.

Included in the services provided through the division are medical, surgical, medical-social, and nursing services; hospitaliza-

tion; convalescent care; speech instruction and dental care for cleft palate and harelip cases; also shoe corrections, braces, and other appliances when needed. The division works closely with the Special Education and Vocational Rehabilitation Services of the State Department of Education, the Colorado Society for Crippled Children, the National Foundation for Infantile Paralysis, the American Legion, the Rotary Club, Masonic organizations, and other agencies.

### EXPANDING NEEDS

Shortage of personnel and heavy case-loads necessitated reduction of certain services during the war. Nevertheless, the organizational efforts and the consultant services developed in previous years proved to be a sound foundation upon which the basic program could be maintained throughout the emergency period. The unceasing cooperation of medical and hospital personnel, of the various county services, of interested organizations, and of the convalescent groups helped greatly to smooth the path.

Looking toward the future, the division personnel realize that not only are there many gaps to be filled and services to be restored, but also new phases to be developed in work for handicapped children. Even before the war there were calls upon the division to extend its definition of the crippled child to include rheumatic fever, diabetes, epilepsy, and similar handicapping conditions for which the family physician frequently has occasion to call upon specialists or state-wide services. From many quarters there also was the demand that the division extend its services to Denver. Until 1945, this city was entirely excluded from the division's program, in compliance with a ruling of the United States Children's Bureau based on the Social Security Act provision that service be rendered primarily in rural areas.

Throughout the war period the need for more social, educational, and vocational services became increasingly evident. Many children who had received the maximum of medical and hospital care for physical disabilities were found to be more handicapped from personality problems growing out of the conditions than from the actual deformities. Despite increased employment opportunities, many young persons with handicapping physical conditions found it impossible to adapt themselves to the pressures and demands of the period. Because of the limited vocational rehabilitation resources, many of them followed the path of least resistance, accepting employment which was available at the moment but which afforded neither satisfaction in the work nor adequate remuneration.

The need for increased convalescent and foster home services became more and more acute during the past six years. Likewise, there long has been a recognized and growing need for a special home for children with extreme physical handicaps whose mentality is normal. No definite steps have been taken to meet this

lack, however, because of variations in age, disability, and nursing and educational requirements of the children and because of the many organizations and services involved. The need for such an establishment now has become a crying one, not because of the number of children to be accommodated but because of the urgency of the individual cases. It is a problem that should be studied carefully and brought to an early solution through the joint planning of the numerous interested agencies.

The spirit of helpfulness, the long range vision, and the expanding programs of the coordinated agencies give hope that some of these many needs may be met. Particular note should be made of the helpful support, by both private and public organizations, which made it possible to carry on the services for crippled children in spite of wartime difficulties. The Colorado Society for Crippled Children not only came to the rescue during a budget crisis but also gave extensive assistance through an expanded program. The opening of Sewall House in Denver by this society provided facilities for physical and occupational therapy for all types of crippling conditions. The National Foundation for Infantile Paralysis gave financial and consultative assistance not only during epidemics of crippling diseases but also in the long-range program for children with infantile paralysis. The National Jewish Hospital opened the doors of its newly finished children's ward very freely to children with tuberculous bone infections. Many agencies such as the Rotary Club, the Shriners, and the American Legion contributed greatly, in various ways, to the services for crippled children. State and local health, welfare, and educational agencies also cooperated in meeting the expanding demands as fully as their resources permitted.

### SERVICES PROVIDED

Statistics on the services provided under the program for crippled children during the period 1940-1945 are presented in Table XVIII. The report throws light on many interesting points. Most outstanding is the increase in the annual total number of children served. The peak total of 1,856 children receiving services (all types) in 1944 is 50 per cent higher than the total of 1,239 for 1940. The number of children receiving clinic services declined from a peak figure of 1,210 in 1941 to only 747 in 1944, but rose again in 1945 to 1,081. The figures on public health nursing services for crippled children show irregular decreases in the annual number of children served and a steady decline in the number of visits per child. However, the reduction in nursing services does not appear proportionate to the decrease in specialized staffs in rural areas during the war years.

The hospitalization period averaged 66 days per hospitalized child in 1944 and 57 days in 1945, in comparison with only 35 days in 1940. Days of convalescent care per patient averaged almost 45 for the six-year period but ranged from 30 to 90 days

in the individual years. Expenditures for hospitalization and convalescent services doubtless could be materially reduced by provision of adequate professional staffs in public health and welfare departments, on both state and local levels. This inference is clear because, with assurance of adequate nursing and social services in the homes, earlier hospital dismissal would be permissible.

TABLE XVIII  
SERVICES TO CRIPPLED CHILDREN, COLORADO<sup>a</sup>, 1940-1945

TYPE OF SERVICE	Total	1940	1941	1942	1943	1944	1945
All types of service:							
Children served -----	8,997	1,239	1,460	1,265	1,631	1,856	1,546
Examinations:							
Children served -----	5,655	872	1,210	901	844	747	1,081
In field clinics -----	9,117	1,080	1,789	1,684	1,410	1,617	1,537
In doctor's office -----	3,279	913	1,256	629	149	156	176
Examinations per child --	2.2	2.3	2.5	2.6	1.8	2.4	1.6
Public health nursing: <sup>b</sup>							
Children served -----	8,511	1,528	1,489	1,657	1,322	1,142	1,373
Field and office visits <sup>c</sup> --	33,142	8,347	7,534	5,442	4,134	3,514	4,171
Visits per child -----	3.9	5.5	5.1	3.3	3.1	3.1	3.0
Medical social service:							
Children served -----	5,155	1,084	827	1,256	712	685	591
Hospital service:							
Children served -----	1,352	247	340	184	181	189	211
Days of care -----	61,576	8,743	13,780	5,483	9,069	12,481	12,020
Days per child -----	45.5	35.4	40.5	29.8	50.1	66.0	57.0
Convalescent care:							
Children served -----	404	97	105	67	46	41	48
Days of care -----	17,972	4,267	3,115	2,609	1,982	3,687	2,312
Days per child -----	44.5	44.0	29.7	38.9	43.1	89.9	48.2
Vocational rehabilitation:							
Referrals -----	415	117	142	55	58	28	15
Physical therapy:							
Children served -----	320	28	128	77	11	31	45
Visits -----	2,402	587	366	253	213	375	608
Visits per child -----	7.5	21.0	2.9	3.3	19.4	12.1	13.5
Foster home care:							
Children served -----	56	16	13	7	5	5	10
Days of care -----	2,622	406	969	304	305	155	483
Days per child -----	46.8	25.4	74.5	43.4	61.0	31.0	48.3

<sup>a</sup> Exclusive of Denver until 1945.

<sup>b</sup> With a few exceptions, visits by full-time public health nurses employed under official funds, exclusive of the cities of Denver and Pueblo.

<sup>c</sup> Exclusive of "first" or admission visits.

## REGISTER OF CRIPPLED CHILDREN

Since the beginning of the program in 1936, this division has developed and maintained a register of children in Colorado, exclusive of Denver, who are eligible for services under the program for crippled children. The register is cleared quarterly to eliminate names of individuals who have died, reached the age of 21 years, received complete remedial treatment, moved out of the state, or otherwise have become ineligible for services through this division. The following tabulation of the number of children on the register at the end of each successive year shows that the record became progressively more complete through 1943, and since then has remained fairly stable at somewhat more than 3,300 names, excluding Denver.

Year	Children
1936.....	515
1937.....	1,028
1938.....	1,373
1939.....	2,155
1940.....	2,494
1941.....	2,835
1942.....	2,850
1943.....	3,351
1944.....	3,311
1945.....	3,333

The inauguration of a register for Denver in 1945 added 492 names to the total for the state, giving 3,825 names by the close of that year, including 31 persons whose eligibility was under study. Since experience has shown that several years are needed to bring a register to a relatively static point, it is expected that there will be a continued increase in the total for the state, including Denver, until the Denver register reaches a normal level. The register is used to determine whether children receive adequate diagnosis, treatment, and follow-up services; and to provide statistics and information for planning programs and studying crippling conditions.

The number of eligible handicapped children on the register on December 31, 1945, and the total number who received services in 1945 are shown, by county in Table XIX, together with data on the number of examinations, days of hospital and convalescent care, and public health nursing visits. For the state as a whole, the handicapped children on the register represented a rate of 3.4 per 1,000 population, taking the 1940 census as a base. In comparing the rates by county, as shown in the second column of the table, it should be borne in mind that the differences reflect variations in completeness of registration as much or more than differences in the prevalence of crippling conditions among the population under 21 years of age. For example, the rate for Denver—where the registration plan has been in operation only one year—

is 1.5 per 1,000 population in comparison with 7 or 8 names per 1,000 population in counties where the registration is probably most complete. In order that the register may serve as an accurate guide in planning programs to meet the needs of the handicapped children, every effort should be made to make the reporting complete and up-to-date.

### TYPES OF DISABILITIES

An analysis of the diagnostic records for nearly 3,800 eligible children on the register at the end of December, 1945, showed a total of 4,406 handicapping conditions, some of the children being afflicted with more than one. Nearly two-fifths of these disabilities were ascribed to congenital defects and birth injuries. Another one-fifth were disturbances of innervation or of psychic control resulting from poliomyelitis and encephalitis. (Figure 17.) A detailed classification of the handicapping conditions is presented in Table XX.

TABLE XIX  
ANALYSIS OF THE REGISTER OF CRIPPLED CHILDREN  
AND OF SELECTED SERVICES, BY COUNTY  
COLORADO, 1945

COUNTY	Number of Children			Selected Service		
	On the Register December 1945 <sup>a</sup>	Per 1,000 Population <sup>b</sup>	Served in 1945	Clinic and Office Examinations	Days Hospital and Convalescent Care	Public Health Nursing Visits
Total	3,794	3.4	1,546	1,713	14,332	4,171
Adams	63	2.8	29	61	101	187
Alamosa	81	7.7	33	39	281	10
Arapahoe	159	4.9	79	85	471	460
Archuleta	13	3.4	3	—	28	—
Baca	50	8.1	8	8	74	—
Bent	40	4.1	25	22	119	80
Boulder	113	3.0	60	36	667	214
Chaffee	20	2.5	10	14	15	—
Cheyenne	10	3.4	3	5	—	2
Clear Creek	4	1.1	3	9	26	43
Conejos	50	4.3	31	36	518	2
Costilla	42	5.6	15	18	175	2
Crowley	39	7.2	30	23	119	128
Custer	7	3.1	2	1	—	—
Delta	50	3.0	26	26	118	2
Denver	492	1.5	37	103	32	— <sup>c</sup>
Dolores	6	3.1	4	3	3	—
Douglas	9	2.6	2	5	13	19
Eagle	18	3.4	7	6	78	40
Elbert	15	2.7	4	9	—	—
El Paso	181	3.4	70	61	1,008	372
Fremont	55	2.8	44	49	568	200
Garfield	38	3.6	17	15	—	51
Gilpin	1	0.6	1	—	—	—
Grand	8	2.2	1	—	—	—
Gunnison	24	3.9	6	5	—	20
Hinsdale	—	—	—	—	—	—
Huerfano	40	2.5	21	25	226	—
Jackson	8	4.4	1	—	—	—
Jefferson	83	2.7	58	72	756	150
Kiowa	12	4.3	7	6	139	2
Kit Carson	16	2.1	3	1	—	—
Lake	18	2.6	13	5	314	84
La Plata	71	4.6	49	25	212	130
Larimer	143	4.0	52	74	67	224
Las Animas	204	6.3	103	155	492	398
Lincoln	28	4.8	6	6	—	3
Logan	100	5.4	76	56	534	196
Mesa	128	3.8	50	50	1,085	—
Mineral	7	7.2	2	2	—	—
Moffat	15	2.9	6	3	121	—
Montezuma	54	5.2	14	14	14	—
Montrose	62	4.0	20	17	284	3
Morgan	80	4.6	24	32	60	54
Otero	171	7.3	65	78	531	300

TABLE XIX (Continued)

COUNTY	Number of Children			Selected Service		
	On the Register December 1945 <sup>a</sup>	Per 1,000 Population <sup>b</sup>	Served in 1945	Clinic Office Examinations	Days Hospital and Convalescent Care	Public Health Nursing Visits
Ouray	—	—	—	—	—	—
Park	14	4.3	4	5	64	—
Phillips	17	3.4	6	7	51	—
Pitkin	—	—	—	—	—	—
Prowers	62	5.0	12	15	185	—
Pueblo	380	5.5	115	162	2,589	39
Rio Blanco	14	4.8	5	10	35	—
Rio Grande	64	5.2	28	34	818	11
Routt	72	6.8	41	43	585	124
Saguache	13	2.1	8	9	—	6
San Juan	7	4.9	2	1	—	—
San Miguel	—	—	—	—	—	—
Sedgwick	8	1.5	7	8	171	—
Summit	—	—	—	—	—	—
Teller	15	2.3	5	5	71	—
Washington	61	7.3	25	34	34	—
Weld	189	3.0	142	98	394	354
Yuma	50	4.1	26	22	86	261

<sup>a</sup> Children under 21 eligible for services through the Division of Crippled Children. The register is cleared quarterly to eliminate names of individuals who have died, reached age 21, moved out of the state, received complete treatment, or otherwise become ineligible. Excludes 31 individuals whose eligibility was under study.

<sup>b</sup> Total population, all ages, according to the 1940 census.

<sup>c</sup> Exclusive of "first" or admission visits. With a few exceptions visits by full-time public health nurses employed under official funds, exclusive of the cities of Denver and Pueblo.

TABLE XX

DISABILITIES OF CHILDREN ON THE REGISTER OF  
CRIPPLED CHILDREN, COLORADO, December 31, 1945

(4,406 disabilities as diagnosed for 3,794 children)

DISABILITY	Number	Per Cent
Total .....	4,406	100.0
Conditions due to congenital defects and birth injuries .....	1,733	39.3
Club feet .....	363	8.2
Spastic paralysis—from birth injuries .....	342	7.8
Cleft palate .....	208	4.7
Deformity of joint.....	203	4.6
Harelip .....	171	3.9
Dislocation of hip .....	169	3.8
Absence of part .....	65	1.5
Birth injury of peripheral nerve .....	59	1.3
Wry-neck (Torticollis) .....	33	.8
Supernumerary parts .....	29	.7
Cleft spine (Spina bifida) .....	21	.5
Webbed fingers or toes (Syndactylism) .....	19	.4
Harelip and cleft palate .....	14	.3
Bony outgrowth (Extosis) .....	12	.3
Dislocation, other than hip .....	5	.1
Other (anomalies, etc.) .....	20	.4
Disturbances of innervation or of physic control .....	899	20.4
Post poliomyelitis .....	869	19.7
Post encephalitis .....	30	.7
Skeletal and muscular conditions due to uncertain or unknown causes .....	645	14.6
Flat feet .....	353	8.0
Inflammation of hip joint (Perthes disease).....	97	2.2
Scoliosis (morbid lateral spinal curvature) .....	60	1.4
Malposture .....	41	.9
Muscular dystrophy and muscular atrophy.....	30	.7
Lack of cartilage development (Achondroplasia) ..	11	.2
Bowlegs .....	10	.2
Other .....	43	1.0
Conditions due to injury other than birth injuries .....	448	10.2
Arm deformity .....	152	3.4
Deformity due to burns .....	82	1.9
Leg deformity .....	56	1.3
Amputated member .....	49	1.1
Hip deformity .....	18	.4
Spinal deformity .....	3	.1
Other .....	88	2.0

TABLE XX (Continued)

DISABILITY	Number	Per Cent
Conditions due to infections and arthritis .....	403	9.2
Osteomyelitis (inflammation of marrow bone) ....	99	2.3
Tuberculosis of hip, knee, etc. . . .	61	1.4
Arthritic crippling conditions .....	40	.9
Tuberculosis of spine . . . . .	34	.8
Other conditions due to known infection .....	169	3.8
Conditions due to disturbances of metabolism, growth, or nutrition .....	141	3.2
Knock knees .....	68	1.6
Bowlegs .....	27	.6
Flat feet ....	10	.2
Other .....	36	.8
Eye conditions ..	98	2.2
New growths .....	27	.6
Undetermined ..	12	.3

Figure 17. CAUSES OF HANDICAPPING CONDITIONS  
 PERCENTAGE ANALYSIS OF CONDITIONS OF  
 CHILDREN ON REGISTER OF CRIPPLED  
 CHILDREN, COLORADO  
 December 31, 1945



4,406 Disabilities as Diagnosed for 3,794 Children

\* Disturbances of metabolism, growth or nutrition

\*\* Eye conditions  
 \*\*\* New growths and misc. other cond.

## DIVISION OF DENTAL HEALTH

The dental health program, initiated early in 1940, as part of the services of the Division of Maternal and Child Health, was placed under a separate division in 1941. The primary responsibility of the Division of Dental Health is to plan and develop programs that will protect, promote, and enhance the dental health of the citizens of Colorado.

### NATURE OF THE PROGRAM

The division acts in a liaison capacity between the State Division of Public Health, local health departments, the dental profession, and community organizations interested in promoting dental health. The director plans dental programs at the state level and assists in integrating these programs into the general public health activities of local health departments and public health nursing services. In addition the division furnishes consultant service to professional or lay groups, sponsors and conducts dental examination programs, prepares and distributes dental health education materials, and provides lecture service.

In the first year of the program the principal efforts were directed toward stimulation of dental health education for three main groups—children of school age, infants and preschool children, and maternity patients—with primary emphasis on school dental programs. Maintenance of the program and expansion of activities were impeded by the shortage of professional personnel during the war years. Many communities were without dentists because all had been drawn into military service, and in other areas the remaining dentists were overburdened taking care of emergency cases. The professional staff of the State Division of Public Health also was seriously depleted, and the remaining personnel had to carry a multiplicity of responsibilities. Nevertheless the dental health program was continued throughout the period of this report. Furthermore, several new services were initiated.

### DENTAL HEALTH EDUCATION

Provision of dental health education materials and of lecture services were integral and continuing aspects of the program as a whole and also of the services for special groups. In 1940 the director published articles, charts, and other materials. The articles included the following:

“Tooth Pastes, Powders and Liquids Acceptable  
to the American Dental Association.”

“Tooth Brushes and Their Home Care.”

“Mouth Washes.”

“Calcium Metabolism of the Teeth.”

“Chronology of Human Dentition.”

These materials as well as literature obtained from other agencies were widely distributed in the state during the period 1940-1945. A lending library of slides and motion picture films on dental subjects also has been maintained since 1940. Literature and films are obtainable, upon request, by organizations and by health and educational workers and other responsible persons.

To assist teachers in providing dental health education and in referring children to dentists, a guide entitled *A Manual of Dental Health for Teachers* was prepared in 1940. The manual consisted of a syllabus on the highlights of a standard school dental program. Teachers also were supplied with references on various dental subjects; a list of visual education materials for teaching dental health; and a leaflet, *Points That Teachers Should Keep in Mind for the Preschool and School Child*. The Director of the Division of Dental Health was a member of the editorial committee of the Joint Committee on School Health which published the health handbook for teachers, *Conserving the Health of Colorado's Children*, in 1944. A section on dental health is included in the book.

The success or failure of a dental program in any community depends to a great extent upon the quality of the professional service available in the area. In 1941, therefore, refresher courses for dentists were inaugurated under the auspices of this division in six centers in the state: Steamboat Springs, Grand Junction, Durango, Monte Vista, La Junta, and Sterling. Two pedodontists cooperated in the instruction program, each presenting a course in three centers. The principal subjects were child psychology as related to child patients and their parents, dental examinations, operative techniques in various types of dental treatment, and consultation methods and procedures. Because of wartime travel conditions, it was necessary to discontinue the refresher courses in 1943.

## SERVICES FOR CHILDREN

During the entire period 1940-1945, the principal activities were those directed toward development of dental health programs for children of school age. This group not only is in the period of greatest growth and development; it also is an easily available group, at an impressionable age, which is under the guidance of trained educators who can assist greatly in making health programs effective. At first the school programs were developed only in communities where certain favorable situations existed, that is, (1) where local dentists were available and wished to cooperate, (2) where school authorities wanted a program, and (3) where lay groups were interested in sponsoring the program. A very important early phase of the programs was the promotion of at least one dental examination a year for all school children, in the offices of their own dentists. Because of the war, however, many rural areas were without dentists by 1942. In that year, therefore, the school dental programs were expanded to include some localities

which lacked dentists but had public health nursing service. Dentists were imported into central locations to provide dental examinations to school children. The dentists were paid an hourly fee for their examination services by this division. In each participating area some local organization such as the Red Cross chapter, the board of county commissioners, a farm group, or other civic group offered funds to assist in paying for the dental care needed by medically indigent children.

Counties in which the programs for school children were given particular emphasis in one or more of the six years covered by this report included the following: Adams, Alamosa, Arapahoe, Boulder, Costilla, Eagle, El Paso, Grand, Larimer, Lincoln, Logan, Otero, Weld, and Yuma.

The number of infants and preschool children reached through the dental health program of the division was comparatively small. However, educational material was provided for distribution at some of the child health conferences (permanent well-child centers maintained in scattered areas of the state through the Division of Maternal and Child Health). The Director of the Division of Dental Health also gave consultation service and examined a limited number of children in these age groups. In 1944 quarterly dental examinations were incorporated as a regular part of the child health conferences in Berthoud and Estes Park.

### DENTAL SERVICES FOR MATERNITY PATIENTS

Initially, the program for maternity patients consisted primarily of lectures and the distribution of educational materials covering the relationship of diet to pregnancy and the teeth, the importance of good oral hygiene for the expectant mother, and the need of proper nutrition for the infant. Nurses also were provided with literature on teaching methods to assist them in educating the mothers as to these needs.

As stated in the report of the Division of Maternal and Child Health, a Maternity Pay Plan was in operation in Otero County, from 1940 through 1945, to provide maternity care to medically indigent residents of the county. In 1941 a dental care program for the mothers was incorporated into the Maternity Pay Plan to round out the demonstration of complete maternity care. The objectives of the dental service were to clear up all possible dental foci of infection, preserve and restore to normal functions all teeth possible, and return the oral tissues to as nearly a normal condition as feasible for the maternity patients. All of the dental care was provided under funds appropriated for maternal and child health purposes. The treatments were rendered in the offices of private dentists on a fee basis in Fowler, Rocky Ford, and La Junta. Three dentists cooperated in La Junta, two in Rocky Ford, and one in Fowler. The plan provided for necessary prophylaxis, fillings (silver amalgam, silicate, and cement), extractions, X-rays, and Vincent's treatment.

In 1943 the division's program was expanded to provide dental care for patients accepted under the Emergency Maternity and Infant Care Program, under which wives of servicemen in the four lowest pay grades are entitled to complete maternity care. Under the Colorado plan, these women may receive certain types of dental care, namely: fillings (silver amalgam, silicate, and cement), extractions, radiographs, Vincent's treatment, and prophylaxis. The patient notifies this division as to the dentist of her choice, and he then is sent information and forms. A report on the dental care phase of the program has been prepared for publication, elsewhere.

### SPECIAL STUDIES AND ACTIVITIES

In 1942 the division inaugurated a dental caries control service designed to give a rating of the caries susceptibility of patients as a guide to dentists and orthodontists in the proper handling of their cases, and to give dietary guidance for the reduction of caries development. Detailed information concerning the program is presented in a brochure (DH-23), *Dental Caries Control Service*. This outlines, among other things, the recommended dietary regimen and the procedure for taking saliva specimens for laboratory analysis.

As part of the health survey of state institutions requested of the State Board of Health by the Governor and the Interim Committee of the Thirty-Fourth General Assembly in 1944, a survey of dental health was conducted in the eleven institutions. The dental care provided by the institutions was found to vary from complete care to none at all.

In 1945 the Director of Dental Health cooperated with Dr. Frederick S. McKay of Colorado Springs in a fluorine study conducted in the city of Montrose. The findings will be published in the November, 1946, issue of the *American Journal of Public Health*.

### FUTURE OBJECTIVES

It is hoped that in the future the dental health program will expand along the following lines:

- Re-establishment of the refresher courses for the dental profession.

- Furtherance of studies into the relationship between fluorine content of local public water supplies and the dental caries attack rate.

- Incorporation of a periodic dental examination as a regular part of all well-child conferences.

- Development of programs to provide dental care for pre-school children who are unable to obtain such care.

- Development of dental health programs for prenatal patients.

- Organization of regular dental examination programs for all grade school children.

## DIVISION OF FOOD AND DRUGS AND RESTAURANT SANITATION

The work of this division, with the State Food and Drug Commissioner as director, embraces a wide range of inspections and investigations in the enforcement of numerous Colorado laws pertaining to the purity of foods and drugs and the sanitation of places wherein they are manufactured and sold. These laws are: The Food and Drug Law of 1907, Pure Food and Sanitation Inspection Law of 1913, Caustic Alkali Law of 1925, a law of 1933 assigning the duties of the Meat and Slaughter Plant Inspector to the State Board of Health, the Restaurant Act of 1935, and the Narcotic Act of 1935.

During most of the period covered by this report, it was difficult for the division properly to carry out the activities assigned to it, because of lack of personnel and an inadequate salary scale. Nevertheless, a great deal of work was accomplished.

### ADULTERATIONS AND MISBRANDING

The division cooperated with other state agencies and with the United States Food and Drug Administration in protecting consumers against harmful, adulterated, and misbranded merchandise. Many inspections and investigations were made to determine purity of food and drug products and to secure compliance with labeling requirements. Samples of products were collected and submitted to the State Chemist for analysis<sup>1</sup>. Where violations of purity or labeling regulations were found, proper action was taken to remove the product from the market or to have the labeling corrected. When necessary, hearings were conducted by the State Food and Drug Commissioner, and the facts were submitted to the District Attorney for court action.

Many samples of meat products were obtained, and when adulteration was determined court cases were filed. Convictions were obtained in every instance. Adulteration of hamburger was the principal offense.

From time to time individuals and firms attempted to place on the market various drug items, particularly remedies, that were considered either dangerous to health or of no therapeutic value. Such products were prevented from being sold. In several instances, firms were ordered to discontinue misrepresentation or false claims, one example of the misrepresented products being a "sulfa" tonic and another an imitation fruit drink on the label of which were certain inaccurate vitamin claims.

Scarcity of certain food and drug items during the war necessitated special vigilance in protecting consumers against substitu-

<sup>1</sup>This service by the State Chemist, University of Colorado, is provided through an item in the budget of the Division of Laboratories, State Division of Public Health.

tions and adulterations. To this end, the division issued a bulletin, *Harmful Adulteration of Food During Wartime*, including information as to the possibility of foods being poisoned by enemy agents.

For several years, the State Food and Drug Commissioner has been chairman of the Committee on Adulteration and Sophistication of the Colorado Pharmacal Association. This committee investigates reports of adulteration.

### FOOD PLANT SANITATION

Numerous inspections were made of such places as canneries, slaughter houses, frozen food lockers, bottling plants, markets, bakeries, and candy factories in order to secure compliance with sanitation requirements. The establishments were investigated as to general sanitary conditions, including condition of the buildings, cleanliness of equipment, and proper storage and handling of ingredients and finished products. Continuous effort was made to have all food plants kept rodent proof; to institute better insect control; and to obtain better locker rooms, toilets, and hand washing facilities for the workers.

Considerable work was done with the canning industry in order to obtain better sanitation and also better products. Improved water supplies were ordered in several canning plants, and compliance was obtained. It is hoped that additional food sanitation personnel can be assigned to this important industry in the future, as the canners have expressed desire for expanded inspection service in their plants.

In many instances the inspection of slaughter plants by this division resulted in improvements, including the construction of several new plants. It is hoped that in the future more systematic and continuous inspection can be devoted to slaughter plants throughout the state.

Because the frozen food industry was expanding during the years covered by this report, it was necessary for this division to devote considerable time to new problems related to frozen products. Numerous inspections of locker plants were made, and it was recommended that the legislature enact a Locker Plant and Cold Storage Law authorizing more adequate control of the plants.

Most of the bottling plants in the state operated in a creditable manner during the past six years. In some cases, however, new equipment and buildings were needed. These doubtless will be provided when the scarcity of materials lessens. Because of the shortage of metals during the war, many bottlers and brewers found it necessary to reclaim bottle caps or to make crowns from reclaimed tin. As there was some danger to public health from such practices, this division investigated the procedures and issued a bulletin specifying requirements to be met in order to receive approval for the use of the caps and crowns.

A survey of fruit and vegetable stands was made in 1945. Although some improvement of conditions was secured, further work is planned in order to obtain better sanitation and greater protection of products.

With the heavy migration of Japanese-Americans to this state after war was declared, problems arose regarding plants opened for the manufacture and sale of Japanese products. Compliance with requirements was obtained, however, and little difficulty was experienced after these newcomers had been informed of Colorado regulations.

Most of the larger food plants, including wholesale bakeries and candy factories, showed marked improvement in sanitation during the years 1940-1945, but considerable work with some small operators still is needed.

### RESTAURANT INSPECTION

A major activity of this division is the enforcement of the Restaurant Act of 1935 and the regulations pertaining thereto. The division issues licenses to all restaurants throughout the state and has authority to refuse, suspend, or revoke licenses. Each year numerous applicants are refused licenses because of failure to meet the requirements, and in some instances restaurants are closed or licenses are suspended for violations.

It has become the policy to inspect all new restaurants and cafes before granting licenses. Included in the inspection is the securing of water samples from all places with a private supply, in order to insure that "safe" water is used. When a serious violation is discovered, the license is suspended and the operator of the establishment is given a hearing. Often, however, the owner merely is asked to close the restaurant in order to make the improvements necessary for compliance with regulations, and many operators have followed this procedure. In towns or counties where there is local inspection, the state inspectors cooperate with the local inspector or sanitarian.

Strict enforcement of the restaurant regulations was particularly necessary during the war years, when an unusually large number of people were eating in public establishments. The Restaurant Act made it possible to control the operation of "food shacks," trailer lunch wagons and "joints." These might have been a menace to health because of lack of proper facilities.

Dish swab tests for bacteriological examination of eating and drinking utensils were made to a limited extent. An expansion of this program is planned.

In 1945 the state restaurant regulations were revised to make them consistent with the Model Ordinance of the United States Public Health Service.

## HEALTH EXAMINATIONS AND EDUCATIONAL PROGRAMS

All food handlers in Colorado are required to have medical examinations yearly and to obtain permits, or health cards, from this division. Throughout the period of this report the required examinations included blood tests for venereal disease. Plans are being made to include chest X-rays as part of the requirements.

One of the objectives of the division is to educate all food handlers as to the most sanitary methods. As a result of educational programs, compliance with regulations was more easily secured in many instances in recent years. Several courses for food handlers were conducted and proved very successful in educating operators and employees in better food handling practices. It is expected that an increasing number of the courses will be conducted in the future.

A seminar held for state, county, and local inspectors and sanitarians in 1945 was well attended. It is planned to hold such seminars on food inspection problems and sanitation annually or even more frequently in the future.

From time to time, representatives of this division attended conferences of food processors and growers in order to assist in promoting better Colorado products.

## NARCOTIC CONTROL

The narcotic control program of the division includes two main types of activities: (1) Narcotic prescription files and records in drug stores are examined for possible violations of the Narcotic Act; and (2) licenses are issued to manufacturers and wholesalers of narcotics, as required by law. In addition, cooperation is given the United States Bureau of Narcotics in the suppression of marihuana traffic in Colorado and in the control of other narcotic drugs.

## SUMMARY OF ACTIVITIES

The tabulation presented below summarizes the major activities of the division for the past six years. In addition, considerable quantities of food and drug products were condemned as unfit for use and were removed from the channels of trade. These condemned products included a great variety of commodities.

### FOOD AND DRUG CONTROL ACTIVITIES 1940-1945

Inspections made.....	69,511
Instructions given.....	34,195
Visits to towns.....	12,375
Plumbing installations ordered.....	1,227

## SAMPLES SUBMITTED

Samples submitted to the State Chemist in enforcement of the Food and Drug Law of 1907.....	1,594
Other samples submitted to the State Chemist.....	392

## HEARINGS AND CASES

Hearings held .....	136
Cases filed in the District Court.....	44
Convictions in the District Court.....	20
Complaints filed with the District Attorney.....	14
Assistance in United States narcotic cases filed in the Federal Court.....	7

## RESTAURANT SANITATION

Licenses issued .....	19,036
Restaurants ordered to discontinue operation until they had complied with the law.....	138
Restaurants closed .....	33
Licenses suspended.....	24

## HEALTH CARDS ISSUED\*

Negative-examination cards; state, exclusive of Denver....	101,224*
Negative-examination cards, Denver.....	74,498*
Cards issued to persons in noninfectious stages of venereal disease .....	4,072*
New positive cases of venereal disease discovered 1940-1945, inclusive, but not all under treatment.....	3,817

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\*Annual examination required.

## DIVISION OF SANITARY ENGINEERING

The activities of this division in the period 1940-1945 consisted of a variety of programs in the administration of state laws and of rules and regulations of the State Board of Health pertaining to water, sewage, milk, bedding, and general sanitation. The mattress and bedding sanitation program was inaugurated within this period; that is, in July 1940. The programs were conducted as effectively as possible with the available staff, and every effort was made to cooperate with federal agencies and officials in sanitation activities in military and defense plant areas.

### SANITATION PERSONNEL

Low salaries as well as losses of personnel to the armed forces resulted in a serious reduction of the staff of this division during the war. In 1940 the sanitation staff included the chief sanitary engineer, who acts as director, and as many as six assistants; but by the end of 1945 there were only the chief engineer, one public health engineer on loan from the United States Public Health Service, one milk inspector, and one mattress and bedding inspector.

To assist in overcoming the shortage of trained sanitarians in this area, annual schools were held for water works and sewage works operators. The schools were conducted in cooperation with the American Water Works Association, Rocky Mountain Sewage Works Association, Colorado Municipal League, University of Colorado, and other state health departments of the Rocky Mountain Region. Members of water and sewage departments throughout the region attended the classes, as well as water and sewage works operators from military posts. The Director of the Division of Sanitary Engineering served as a member of the Board of Procurement and Assignment Services, aiding in obtaining men experienced in sanitation and health services for the armed forces.

### FUNCTIONS OF THE DIVISION

The division makes surveys, investigations, and inspections and prepares reports related to its numerous specialized functions. Its principal responsibilities include the following:

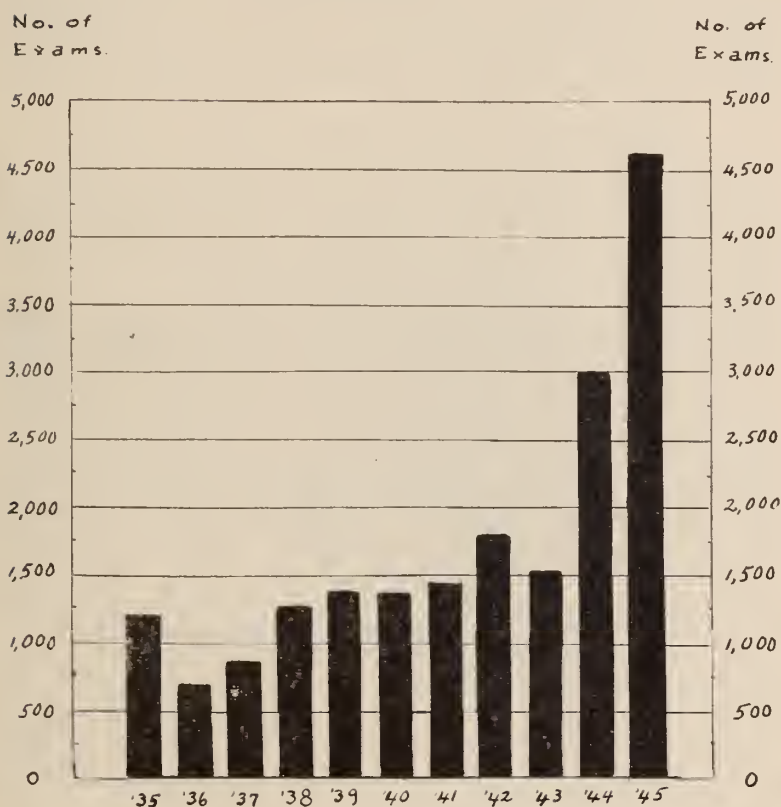
General supervision over the installation and operation of water supply systems (public, semi-public, and private); sewerage systems and sewage treatment plants; industrial waste, garbage and refuse disposal systems; and public swimming pools and camps.

Provision of advice and assistance in the development of water supplies and sewerage facilities for municipalities.

Passing upon all plans for construction of water supply systems and sewerage systems.

Interpretation of the results of microscopic examinations of surface water supplies, the examinations being made by the Division of Laboratories. (Figure 18 shows the great increase in water sanitation examinations by the Division of Laboratories in the period 1935-1945.)

Figure 18. WATER SANITATION EXAMINATIONS  
DIVISION OF LABORATORIES  
1935-1945



Investigations relative to stream pollution.

Collection of weekly reports from water chlorination plants and swimming pools.

Investigation of complaints pertaining to insanitary conditions.

Investigation of the sanitation of tourist and trailer camps.

Analysis, for approval or disapproval, of all commercial hypochlorite products for use in sterilizing dishes and glassware in restaurants.

Annual surveys and reports on water supplies used for drinking and culinary purposes on interstate carriers.

Surveys and inspections in relation to milk sanitation.

Inspection of mattresses and bedding in factories, stores, and shops.

Requests for inspection or consultation services, rendered free of charge, may be referred to full-time health departments or directly to the State Division of Public Health. In the six years 1940-1945, consultation, advice, and reports were furnished to many firms and municipalities relative to a variety of sanitation problems, existing facilities, and needed improvements.

## SURVEYS OF SANITATION FACILITIES

During the war years, complete surveys of water supplies and sewage treatment facilities were made by personnel of this division in all towns where large defense plants were located and also in all towns close to military installations. Reports of the surveys were submitted to the Office of Civilian Defense.

The status of water supplies, sewerage systems, and sewage treatment in incorporated places, as of January 1, 1945, is shown in Tables XXI and XXII. A total of 147 towns and cities with 95 per cent of the estimated total population of the 231 incorporated places in the state had basically safe water supplies. Approximately 90 per cent of the population in the incorporated towns and cities lived in communities where there were sewerage systems, and about the same proportion were protected either by primary or by complete sewage treatment methods.

TABLE XXI  
STATUS OF WATER SUPPLIES OF INCORPORATED  
PLACES IN COLORADO, January 1, 1945

STATUS	Incorporated Cities and Towns	Estimated Population	
		Number <sup>a</sup>	Per Cent
All incorporated places .....	231	634,760	100.0
Water system supplying municipality:			
Basically safe supplies .....	147	604,279	95.2
Basically unsafe supplies (surface, untreated supplies) .....	49	25,561	4.0
No water system supplying municipality .....	35	4,920	.8

<sup>a</sup> Based on 1940 Census.

TABLE XXII  
STATUS OF SEWERAGE AND SEWAGE TREATMENT  
PLANTS IN INCORPORATED PLACES IN COLORADO  
January 1, 1945

STATUS	Incorporated Cities and Towns	Estimated Population	
		Number <sup>a</sup>	Per Cent
All incorporated places .....	231	634,760	100.0
Sewerage system for municipality:			
System .....	103	579,883	91.4
No system .....	128	54,877	8.6
Sewage treatment:			
Primary .....	34	403,569	63.6
Complete .....	18	160,004	25.2
None .....	179	71,187	11.2

<sup>a</sup> Based on 1940 Census.

In 1944 a complete survey of sanitary conditions at eleven state institutions was made by an assistant engineer of this division. The findings were submitted by the State Board of Health to the Governor, together with reports of other divisions which investigated health conditions at the institutions.

### CONSTRUCTION OF SANITATION FACILITIES

Very few new sanitation facilities were constructed during the war because of shortages of labor and materials. However, some new construction was done at military posts, under the direct supervision of the United States Army. This division acted in an advisory capacity when called upon to do so by army officials. The division also supervised the construction of a new sewage disposal plant at the State Home for Mental Defectives at Grand Junction.

Inventories were made of equipment pertaining to water and sewage treatment in all towns in the state. These inventories were kept on file with this division in order to facilitate loans and exchanges of materials between towns when new materials were not available.

### MILK SANITATION

During the period of this report, the milk control program of the division was primarily educational. Efforts were directed mainly toward securing the adoption, by municipalities and counties, of the Standard Milk Ordinance and Code recommended by the United States Public Health Service. This program, which

was a continuation of activities already well developed prior to 1940, received new impetus when the recommended ordinance was adopted by the State Board of Health in 1942 as the standard for the state.

The activities in furtherance of the Standard Ordinance included surveys of dairies and distributing milk plants, at the request of municipal or county officials; arrangement of meetings on milk sanitation problems and the provisions of the Standard Ordinance; assistance to local milk inspectors; and cooperation with army officials. Special emphasis was placed on areas where there were defense plants and military installations. Everything possible was done to assure milk supplies that would meet the standards of the Army, which are the same as those of the United States Public Health Service.

By the end of 1945, the following towns and counties were operating under the Standard Ordinance: Colorado Springs and El Paso County, Trinidad and Las Animas County; Greeley, Grand Junction, Julesburg, La Junta, Leadville, Longmont, Palisade, and Pueblo. In addition, adoption of the ordinance was contemplated by Englewood, Littleton, and Arapahoe County; Arvada, Golden, and Jefferson County; Alamosa, Center, Cortez, Durango, Estes Park, Fort Collins, Loveland, Mancos, Rifle, Rocky Ford, and Salida. It is hoped that in the future a complete milk control program will be developed throughout the state.

In 1943, the milk inspector cooperated in improving sanitary conditions in the manufacture of goat cheese in Las Animas County. Considerable time was spent in efforts to have the manufacturers meet sanitary requirements in order to prevent seizure of their products by the Federal Government. In many instances the producers went out of business. At the time of the original survey there were 47 goat cheese manufacturers in the county, in comparison with only 14 at the end of 1945. Considerable time also was spent in the investigation of reported undulant fever cases in order to ascertain the source of the milk supplies used by the victims and to trace the specific source of the disease.

## MATTRESS AND BEDDING INSPECTION

The early activities under the mattress and bedding inspection program (started in 1940) resulted in an act passed by the General Assembly in 1941 which made the State Board of Health responsible for the enforcement of the sanitary requirements relative to such articles. The purpose of the program is to assure the use of only sanitary materials in the manufacture and sale of mattresses and bedding. The term "bedding" has been construed to mean all articles which may be reclined upon and includes upholstered articles such as couches, chairs, and pillows. Inspections are made in all factories, stores, and shops where the articles were made or are offered for sale. As of December, 1945, there were approximately 500 such places in the state. Inspections in 1945 totaled 2,520.

Bedding manufacturers and sterilizing plants in this state must be licensed, pay yearly fees, and purchase stamps to be affixed to tags sewn to the articles. The tags must describe the articles as to the new or secondhand character of the materials and as to sterilization of used materials or articles. Out-of-state firms shipping bedding or mattresses into Colorado are required to register with the State Division of Public Health, properly tag the articles, and purchase and affix the stamps. Articles improperly tagged are not allowed to be sold, and tags on all mattresses and bedding products sold in Colorado must have stamps on them. There were 127 Colorado firms and 238 out-of-state firms, or a total of 365 manufacturing and sterilizing firms, registered with the division at the end of 1945. New firms and factories will go into business as materials become more available.

Since the latter part of 1945, many articles have been sold from army installations. These must be sterilized, and great vigilance is required in order to prevent unlawful sales of insanitary used articles.

In the majority of instances there was satisfactory compliance with the mattress and bedding sanitation law by the close of 1945. Nevertheless, there were still some evasions of the regulations. An educational program to develop public demand for inspection tags on the articles was in operation, and good results were expected from it.

Colorado is represented in the National Association of Bedding and Upholstery Law Enforcement Officials. This organization, which assists in mutual problems and seeks to bring the bedding sanitation laws of the different states into closer agreement, works in close accord with the National Association of Bedding Manufacturers.

## DIVISION OF PLUMBING INSPECTION

Activities of this division include approval of plans for plumbing installations, issuance of installation permits, and inspection of the installations; investigation of complaints; advisory service on plumbing problems; and licensure of plumbers.

### INSPECTIONS AND INVESTIGATIONS

When requested by architects and owners, the division considers for approval plans and specifications for public, semi-public, and private buildings. Permits are issued for installation of plumbing fixtures in all parts of the state except in cities of first-class status, which have their own regulations and inspectors. During the six years covered by this report, 9,225 permits were issued and 39,090 fixtures were inspected. Inspections of installations, both new and old, are made to ascertain whether the provisions of the State Plumbing Code have been or are being met. Records are kept of all permits issued and inspections made.

In most cases, complaints concern improper installations by property owners and other persons who are not licensed plumbers. It has been found that in about 90 per cent of the installations by owners the work does not comply with the State Plumbing Code, and that in many instances serious hazards to health exist. During the years 1940-1945, a total of 462 complaints were investigated.

A vigorous campaign was waged against cross-connections as applied to hopper closets. Although some progress was made, the program should be continued energetically. Neither the installation of hopper closets nor the repair of old ones for resumed use is permitted.

In 1944, this division made plumbing inspections at eleven state institutions as part of the survey of sanitary and health conditions requested by the Governor and the Interim Committee of the Thirty-Fourth General Assembly. The report included recommendations for replacement of old and worn plumbing and for installations of additional plumbing. Some of the suggestions were carried out, others were taken under advisement, and some were delayed because of lack of materials.

### EXAMINING BOARD OF PLUMBERS

The Examining Board of Plumbers met semi-annually each year. During the six years 1940-1945, regular examinations were given to 372 applicants and special examinations to 97 applicants. As provided by statute, special examinations may be given to master plumbers between regular examination dates; and the board, at its direction, may also give special examinations to journeymen

plumbers if deemed necessary. At the end of 1945 there were 353 licensed master plumbers and 525 licensed journeymen in the state.

### FUTURE NEEDS AND OBJECTIVES

With greatly increased building activity in prospect for the postwar years, the need for plumbing inspection services will be expanding. In order to meet future demands and to improve the quality of installations, the division has set the following objectives:

To secure the services of additional plumbing inspectors, especially for the years 1946-1948, when a great deal of building will be in progress.

To promote plumbing apprentice training by cooperating with the State Board of Vocational Education and the Veterans Administration in the educational programs under the G. I. Bill of Rights.

To propose a statutory amendment restricting the privilege of property owners to do their own plumbing.

To extend more advice and assistance on matters pertaining to plumbing, and to obtain more general compliance with plumbing laws and regulations.

## DIVISION OF INDUSTRIAL HYGIENE

Temporary inactivation of the Division of Industrial Hygiene for seventeen months in 1943 and 1944 was necessitated by lack of professional personnel. In the period of operation, however, many valuable services were rendered, and by the close of 1945 the industrial hygiene program had been strengthened in a number of ways.

### DEVELOPMENT OF THE DIVISION

From March, 1938, when the program was begun, until August 1941, the industrial hygiene activities were conducted by an industrial hygienist in the Division of Sanitary Engineering. In addition, medical problems related to industrial hygiene received attention by physicians on the staff of the State Division of Public Health. Engineering assistance was provided through the Division of Sanitary Engineering.

In August, 1941, a separate Division of Industrial Hygiene was established, with the industrial hygienist as director. Two months later an industrial physician from the United States Public Health Service was lent to Colorado for the duration of the national emergency. A chemical engineer was also added to the staff to assist in field studies and laboratory work.

Early in 1940 preparations were made to lend every assistance to national defense industries for controlling hazards within the plants. Surveys and consultation services were begun in all plants receiving contracts or subcontracts for defense commodities. This work grew so rapidly that it was by far the most important activity of this division from 1940 until March, 1943.

By March of 1943 all professional personnel of the division had entered military service. Consequently the division and laboratory were temporarily inactivated. However, at the request of the Executive Director of the State Division of Public Health, an industrial hygiene engineer was lent to Colorado by the United States Public Health Service. The engineer reported for duty on August 1, 1944, and the division was reactivated as of that date.

An industrial nurse was added to the staff in May of 1945, and a chemist in November of that year. The nurse was experienced in the field of public health and had received graduate training in industrial nursing. The chemist was well qualified and had several years of successful experience as chief chemist with a prominent manufacturing concern. He was sent to the National Institute of Health of the United States Public Health Service, for four weeks to learn specialized industrial hygiene laboratory techniques.

In the reestablishment of the division it was necessary to acquire a new laboratory and new offices. This was difficult because of the acute shortage of office space in Denver during the

war and because of the impossibility of obtaining high priorities for equipment. By December, 1945, however, a very modern and well-equipped laboratory had been completed. In the meantime, new policies and procedures had been developed for office and field activities, and a reprint library had been established.

The former director of the division returned from military service in November, 1945, and the industrial hygiene engineer on loan from the United States Public Health Service was transferred to another state in December. The professional staff then included the director, a nursing consultant, and a chemist; and the division was ready for full-scale activities. There was, however, definite need for an industrial hygiene engineer, as the administrative duties of the director do not permit sufficient time for conducting studies in the field.

All money expended for the industrial hygiene laboratory, equipment, salaries, and rent during the period of this report was allocated from United States Public Health Service sources.

### NATURE OF THE SERVICES

The services of the division have been primarily advisory in character. Broadly stated, the program was concerned with the control and prevention of industrial disease and accidents. It covered subjects such as: toxic substances, dusts, gases, fumes, vapors, abnormal temperatures and humidities; illumination, noise, overcrowding, fatigue; communicable disease in industry; mental and personal hygiene; nutrition; and women and children in industry. Medical, engineering, and nursing services were made available for studies on all phases of industrial hygiene. The main categories of activities in the period covered by this report are briefly described below.

### INVESTIGATION AND CONTROL OF HAZARDS

In response to requests from industrial plants, labor groups, the medical profession, and federal and state agencies, working conditions in a variety of establishments were investigated and evaluated in relation to health hazards and occupational disease control. The establishments included mines, mills, smelters, foundries, machine shops, war plants, canneries, and grain elevators. The studies disclosed the existence of serious health problems including lead poisoning; carbon monoxide poisoning; silicosis and other types of pneumoconiosis; various kinds of industrial dermatitis; and exposure to toxic solvents, vapors, and gases. At the conclusion of each study, a detailed report including recommendations for eliminating the hazards was submitted to the plant or agency involved.

Evaluations of health hazards in underground operations were made in an exhaustive study conducted during the construction of the six-mile Carlton drainage tunnel at Cripple Creek. A report

entitled "An Epidemic of Boils in a Group of Tunnel Workers" prepared in connection with the study was published by the Dermatoses Section of the United States Public Health Service in collaboration with the state Division of Industrial Hygiene.

In addition to requests for comprehensive investigations of working conditions, numerous written and telephone requests for information and advice on specific industrial health problems were received. Each inquiry was answered as promptly as possible. The problems pertained to subjects such as plant medical and nursing facilities, improvement of working conditions, validity of occupational disease claims, and care and maintenance of personal safety equipment.

At the request of plant medical departments, advice and assistance were given as to adequate systems for keeping records and making statistical reports. Steps also were taken to stimulate interest in occupational disease reporting by private physicians. In cooperation with the State Medical Society, a program was initiated to acquaint the medical profession with the importance of complying with the state laws and regulations requiring immediate reporting of occupational diseases.

## OCCUPATIONAL HEALTH CODES AND REGULATIONS

On September 18, 1941, the State Board of Health adopted codes and regulations submitted by the Division of Industrial Hygiene for maintaining healthful working environments in industrial plants. Toxic threshold limits of tolerance and the maximum permissible concentrations of various dusts, fumes, vapors, gases, or other materials that may adversely affect health were defined and included in the public health regulations.

The division also assisted in drafting the Colorado Occupational Disease Disability Act which was passed by the General Assembly, effective January 1, 1946<sup>1</sup>. The act will, for the first time in the history of this state, make occupational diseases compensable. Coverage is limited to diseases listed in a schedule which includes silicosis and asbestosis. It is anticipated that the act will cause a greatly increased demand, particularly by the Industrial Commission of Colorado, for the services of this division.

## NURSING SERVICES

The activities of the advisory industrial nurse, started in May, 1945, consisted primarily of promoting nursing services in industry and encouraging better utilization of existing medical services in the community. The basic objectives concerning industrial nursing were: (1) to assist in planning a state-wide program of industrial health, and (2) to act in advisory capacity to individual nurses.

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<sup>1</sup>The final draft of the bill does not necessarily enunciate policies and views of this division.

During 1945, 30 plants were visited by the industrial health nurse. Twenty-two of the establishments visited had plant nursing services. In these instances, preliminary visits were made by the nurse from the Division of Industrial Hygiene and follow-up visits were made where there was specific need for advisory service. In the other eight establishments no plant nursing services were provided. The industrial nurse was accompanied by the director of the division on her visits to these plants. First aid facilities were observed and recommendations were made. Whenever possible a trip through the plant was arranged. This was done for three reasons: (1) to acquaint the advisory nurse with plant environment, (2) to demonstrate the importance of plant visits to the industrial nurse, and (3) to interpret to management and employees the nurse's place in the industrial program.

### INDUSTRIAL HEALTH EDUCATION

The industrial health education program included promotion of medical and nursing services in industry; talks and lectures on health; and articles, technical bulletins, and special reports on health subjects.

Talks and lectures were delivered by personnel of this division to acquaint labor, industry, and lay groups with the importance of general and industrial health programs. In addition, the division distributed industrial health literature and posters to various establishments. Articles on occupational health also were published in local and national periodicals. Personnel from the division attended numerous conferences and conventions dedicated to public health and safety.

The division undertook to assume a liaison role between industry and health agencies. In this connection it developed plans for close cooperation with the other divisions of the State Division of Public Health, the Colorado Tuberculosis Association, the Denver Tuberculosis Society, the Denver Public Health Council, and the United States Public Health Service.





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